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The Medical Work of the Massachusetts Volunteer Aid Association during the Spanish War

BY

[illegible] L. Burrell, M.D.; Mr. J. T. Boyd; E. H. Bradford, M.D.; J. T. Bottomley, M.D. Mr. W. H. Seabury; Miss C. W. Cayford; E. G. Brackett, M.D.; W. H. Prescott, M.D.; James Booth Clark[illegible]n, M.D.; T. B. Shea, M.D.; Myles Standish, M.D.; J. B. Blake, M.D.; F. G. Balch, M.D.

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THE HOSPITAL SHIP "BAY STATE."

BY HERBERT L. BURRELL, M. D., BOSTON.

On the third day of May, 1898, at the request of Governor Wolcott, a number of gentlemen whom he had invited as public-spirited citizens met in the Council Chamber to consider the question as to the advisability of the formation of a sanitary commission. At this meeting the Massachusetts Volunteer Aid Association was formed to render aid to the volunteers who enlisted in the service of the United States. At this time the suggestion was made that a hospital ship would be of use, and that a popular subscription should be started to purchase and equip a vessel as an aid association ship, under the Geneva Conference, Article XIII, which is an international agreement and provides for the recognition of aid association ships. It is as follows:

Article XIII. — The hospital ships which are equipped at the expense of the aid societies, recognized by the governments signing this convention, and which are furnished with a commission emanating from the sovereign, who shall have given express authority for their being fitted out, and with a certificate from the proper naval authority that they have been placed under his control during their fitting out and on their final departure, and that they were then appropriated solely to the purpose of their mission, shall be considered neutral, as well as the whole of their staff. They shall be recognized and protected by the belligerents.

They shall make themselves known by hoisting, together with their national flag, the white flag with a red cross. The distinctive mark of their staff, while performing their duties, shall be an armlet of the same colors.

The outer painting of these hospital ships shall be white, with a red strake.

These ships shall bear aid and assistance to the wounded and wrecked belligerents, without distinction of nationality.

They must take care not to interfere in any way with the movements of the combatants. During and after the battle they must do their duty at their own risk and peril.

The belligerents shall have the right of controlling and visiting them; they will be at liberty to refuse their assistance, to order them to depart, and to detain them if the exigencies of the case require such a step.

The wounded and wrecked picked up by these ships cannot be reclaimed by either of the combatants, and they will be required not to serve during the continuance of the war.

During the month of May Mr. Robert M. Burnett and Dr. C. A. Siegfried looked over various vessels which were offered, and finally decided to purchase the Boston Fruit Company's steamer *Marmion*, formerly *Bowden*. In the latter part of May a Medical Committee of the Association was appointed, consisting of Dr. Samuel A. Green, Dr. Henry P. Walcott and Dr. Herbert L. Burrell, who were asked to confer with the president, Mr. Eben S. Draper, and the secretary, Mr. Elihu B. Hayes.

At this time there was a lack of understanding on the part of those interested and responsible as to what the function of the ship should be. Many regarded its principal object to be that of a supply ship, not alone to furnish supplies to the sick and wounded, but to combatants as well.

Fig. 1. Massachusetts Volunteer Aid Association Hospital Ship *Bay State*.

At this critical period when it was necessary to clearly define what the ship was to do, the late Hon. Sherman Hoar came forward and solved the question. His clear insight into legal technicalities, his absolute honesty of purpose, his masterly tact and extraordinary forcefulness brushed aside all impediments and demonstrated to the Government at Washington the necessity for granting the commission of the ship. From this time on we who served on the hospital ship knew that whenever we turned to him for advice, support or assistance he gave freely. No man ever sacrificed his life to his country with a higher sense of duty, greater zeal and patriotism than Sherman Hoar.

Mr. Robert M. Burnett had practically purchased the steamer *Marmion*, which arrived in Boston on June 6th, and the Medical Committee then made an inspection of the ship. It became clear that a considerable task was before them. The problem of fitting out and equipping a hospital and supply ship was a new one. As an aid association ship it was unique, and the Massachusetts hospital ship *Bay State* is the first aid asso-

ciation ship that has ever been equipped under the Geneva Conference, Article XIII.

One of the committee went to New York and saw the *Solace*, that had at that time just been completed,

FIG. 2. Service table of ward, with dumb waiter connecting with galley above.

and looked at the *Relief*, which was in process of equipment. The result of this journey was instructive, in that it showed that the problem was one that should be approached with a good deal of thought. The ship which was to be fitted out by the Association was to be a hospital and supply ship, and was to be used as a supplementary aid to the medical departments of the army and navy. Many things to copy and many to avoid were suggested by the inspection of the *Solace*, and afterwards of the *Relief*. The *Marmion* was a small ship, the *Solace* and *Relief* were large ships, yet into the *Marmion* it was necessary to place all the essentials of a hospital and supply ship. Here it was deemed best to ask for counsel and advice,

FIG. 3. Aft hurricane deck for convalescent patients.

in writing, of experts, and on June 16th the following circular was issued, requesting gentlemen to co-operate in fitting and equipping a hospital ship:

MY DEAR SIR: — On the recommendation of the Medical Advisory Board of the Massachusetts Volunteer Aid Association, the Executive Committee thereof has appointed you, with , Chairman, to serve as a special committee on , and respectfully asks your active co-operation in fitting out the proposed hospital ship.

The steamship *Marmion* has been secured, and is now at the Atlantic Works, East Boston, being refitted for hospital service, where she will be open to your inspection at any time in business hours.

Information as to the scope of the work of your committee will be furnished by Dr. Herbert L. Burrell, 22 Newbury Street, telephone Back Bay, 219, to whom please send your letter of acceptance.

Earnestly hoping that you can give us the benefit of your advice and experience in carrying forward this work, I remain, Yours respectfully,

(Signed) ELIHU B. HAYES,
Secretary of the Executive Committee.

Each part was subdivided under special headings, and the gentlemen on accepting an appointment to the committee were requested to meet and make a written report in five days.

FIG. 4. Water-closets and slop-hoppers. Water-closets on raised steel platform.

The following gentlemen served on the committees:

Committee on Instruments and X-Ray Apparatus. — Drs. A. T. Cabot, F. H. Williams, Homer Gage and E. A. Codman.

Committee on Sterilization of Surgical Materials. — Drs. M. H. Richardson, W. P. Bolles and Farrar Cobb.

Committee on Clinical Laboratory. — Drs. H. P. Walcott, W. T. Councilman and J. T. Bottomley.

Committee on Photographs. — Drs. E. A. Codman and J. Bapst Blake.

Committee on Surgical Apparatus. — Drs. W. M. Conant, H. W. Cushing and C. F. Painter.

Committee on Equipment of Medicines. — Gen. R. A. Blood, Dr. W. L. Richardson and Mr. Charles A. Clough.

Committee on Water and Ice Supply. — Drs. H. C. Ernst, S. W. Abbott and Charles Harrington.

Committee on Equipment of Vessel. — Drs. E. H. Bradford, H. L. Burrell, F. G. Balch, Paul Thorndike, E. G. Brackett, J. W. Bartol and Mr. T. J. Manahan.

Committee on Nurses. — Dr. Grace Wolcott.

Committee on Equipment of Railroad Trains. — Drs. John Homans, Charles Williams, Lincoln R. Stone and Melville E. Webb.

Committee on Food Supplies. — Drs. G. H. M. Rowe, John Gray Park and Mrs. Ellen H. Richards.

Committee on Yellow Fever. — Drs. C. F. Folsom, G. A. Durgin and J. H. Wright.

Committee on Dysentery. — Drs. F. C. Shattuck, C. F. Withington and W. T. Councilman.

Committee on Typhoid Fever. — Drs. G. B. Shattuck, E. G. Cutler and Richard Cabot.

Committee on Cholera. — Drs. S. H. Durgin and S. W. Abbott.

Committee on Smallpox. — Drs. J. H. McCollom and T. B. Shea.

Committee on Ophthalmic Diseases. — Drs. C. F. Wadsworth and Myles Standish.

Committee on System of Records for Patients. — Drs. R. H. Fitz, George G. Sears, Henry Jackson and John Dane.

Committee on Accounts of Distribution of Supplies. — Dr. W. N. Bullard, Mr. Henley Luce and Dr. George H. Monks.

Committee on Tents. — Drs. Myles Standish and G. H. M. Rowe.

Committee on Uniforms. — Drs. C. M. Green, Abner Post and Mr. W. W. Churchill.

Committee on Medical Inspection of Camps and Distribution of Supplies to Troops. — Gen. R. A. Blood, Drs. Morton Prince and Myles Standish.

Committee on Ventilation and Electric Lights. — Prof. W. T. Sedgwick, Mr. E. M. Wheelwright, Dr. Charles Harrington, Mr. Charles F. Adams, 2d, and Prof. I. N. Hollis.

Committee to arrange the Detail of Life aboard Ship. — Dr. E. H. Bradford, Prof. I. N. Hollis and Dr. Myles Standish.

Committee on Equipment of a Relief Station. — Drs. C. Ellery Stedman, R. W. Greenleaf and Mr. Robert M. Burnett.

The reports of these committees appear at the end of these bound reprints.

It has never ceased to be to the writer a remarkable piece of co-operative work. All of the reports were valuable and they are submitted for publication. By this measure the Medical Committee were in a position at the end of seven days to start on the work, with the submitted counsel and advice of experts. The committees of experts were dismissed and the active work was started under the charge of the Medical Committee. The assistance of the gentlemen was invaluable, and is an excellent illustration of the value of commission work, supplemented by experts. Had the advice of all these gentlemen been followed, chaos would have resulted; it was, therefore, necessary that the Medical Committee should select and elect definite lines of action. In many instances this was very trying and difficult, but the dovetailing of reports together became, as time went on, very simple.

On June 21, 1898, the committees of experts having made their reports, the following circular was sent to each member of the various committees:

DEAR SIR: — On behalf of the Medical Committee of the Massachusetts Volunteer Aid Association, I beg to thank you for the provisional report received from your committee in regard to the hospital ship which is being fitted out. Your advice and assistance are very much appreciated by the Medical Committee, who may find it necessary to call upon you for further assistance in the matter.

Very truly yours,

(Signed) HERBERT L. BURRELL,

Secretary of the Medical Committee.

At this time there came from a host of medical men proffers of assistance in the work which was already under way. To even enumerate the men who were interested and contributed to the success of the planning and construction of the ship is impossible. Suggestions came on every hand, and it seemed as if the whole medical profession was awake. It will always be a source of pride to the writer that he is connected with a profession which sprang into action as promptly

FIG. 5. Large steam sterilizer.

as did the committees of experts of the Massachusetts Volunteer Aid Association. At this time the ship was swarming with experts who were all inquiring about their bit of work, and concentrating their individual efforts on the problem. While the greater part of these gentlemen were medical men, yet the other professions liberally contributed their part to the problem that was presented.

I am personally of the belief that the success of the hospital ship *Bay State* was due to the work done by these committees of experts. It ensured thoroughness of preparation, thought and careful consideration in planning, and was of inestimable value.

During this work the Medical Committee had the privilege of having the active co-operation of Mr. T. J. Manahan, who so thoroughly familiarized himself

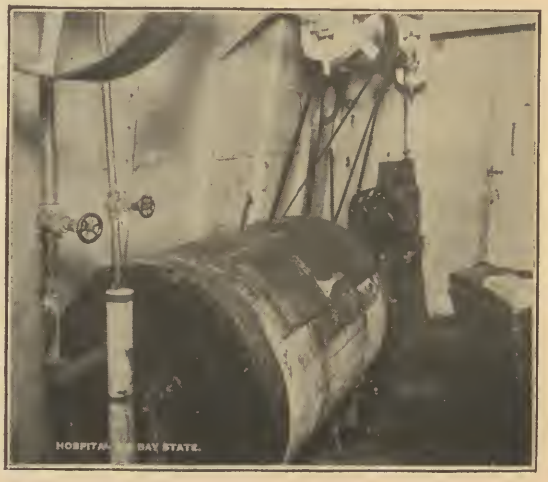

FIG. 6. Laundry machine.

with the details that to him belongs the credit of the medical supervision of the work so far as construction and equipment were concerned.

The value of Mr. Boyd's services, as the consulting engineer of the Atlantic Works, in meeting and perfecting any ideas that were presented to him in the construction and equipment of the vessel, is inestimable.

FIG. 7. Forward ward, three tiers of berths one berth removed, showing berth used as a stretcher.

It was decided that the hospital ship should have the following standard:

She is to provide hospital accommodations for essentially 8,000 Massachusetts troops that are in the field. The *Relief* provides hospital accommodations for 100,000 troops. The Massachusetts hospital ship is to be perfection in providing for its normal capacity, which will be 100, minus that number which it is found necessary to take out to render service for these men perfect. The Massachusetts hospital ship is to be perfect in its elasticity and adaptability to emergencies, and this means that its navigation department and medical department are to be made expansible, that its berthing capacity is to be normally 100, and in exigencies to be increased to 150.

FIG. 8. Forward ward, showing two tiers and three tiers of berths.

It was decided that the ship should be made clean, and it was determined that if she had a construction that could be easily cleansed, she could be kept free from infection. The writer was obliged to leave this work on the 27th of June, and the peculiarly difficult labor of superintending the construction and equipment of the vessel from this point on was carried essentially to its completion by Dr. Edward H. Bradford.

Up to the day of the battle of El Caney, on July 3d, only a small amount of money had been given to the Association. The public were not awake. They did not believe that a hospital ship was necessary. They believed that the United States Government was perfectly capable and competent to take charge of its own sick and wounded, and it was not until an actual fact had been presented to the public that the wherewithal — money — was given for carrying out the work. However, owing to the foresight and business sagacity of Mr. Burnett and Mr. Higginson, the work was going on, and it practically took from the 17th or 18th of June to the 6th of August, that is, seven weeks, to thoroughly renovate and equip the vessel. Of necessity this work was extremely expensive; it was a piece of rush work, and, towards the last, of night work.

The Commonwealth of Massachusetts, by an act of Legislature, appropriated $50,000 to pay for the hos-

pital ship. The State of Massachusetts held the deed, and the ship was placed at the disposal of the Volunteer Aid Association to equip. The construction and equipment of the vessel will be presented by others.

CONSTRUCTION OF MASSACHUSETTS HOSPITAL SHIP "BAY STATE."

BY MR. J. T. BOYD, BOSTON,
Consulting Engineer.

In fitting out the *Bay State*, the work was directly under the charge of the Board of Control, — Major Henry L. Higginson, Mr. Robert Burnett and Dr. Burrell, — receiving the immediate oversight of Mr. Burnett and Dr. Burrell, and, in the absence of Dr. Burrell, of Dr. Bradford, Dr. Manahan being the resident doctor at the works, and the principal assistant in deciding on the work.

The ice machinery was ordered by Mr. Robert Burnett, and I think, without question, is one of the best small plants that has ever been fitted in a vessel.

The sterilizer for the bedding, etc., was ordered by Dr. Durgin, and proved a success.

The fitting out of the operating-room, both in general lay-out and in detail, was the work of Dr. Bradford and Dr. Manahan.

The laundry machinery was decided on by Dr. Manahan.

The berthing details were decided by Dr. Bradford, Professor Hollis and myself. Dr. Manahan assisted in the arrangement of these wards very much.

The storerooms, clinical laboratory, apothecary storeroom and storerooms for surgical apparatus were arranged by the doctors who had charge of these different departments.

The general arrangement of the ventilating, lighting, water system I arranged in consultation with Professor Hollis.

The arrangement and detail of water-closets were discussed by almost every one, and finally settled by Dr. Burrell and myself.

The very best feeling prevailed while this work was in progress, and there was no clashing, which, I think, is one of the principal reasons why the work was done so quickly and so well.

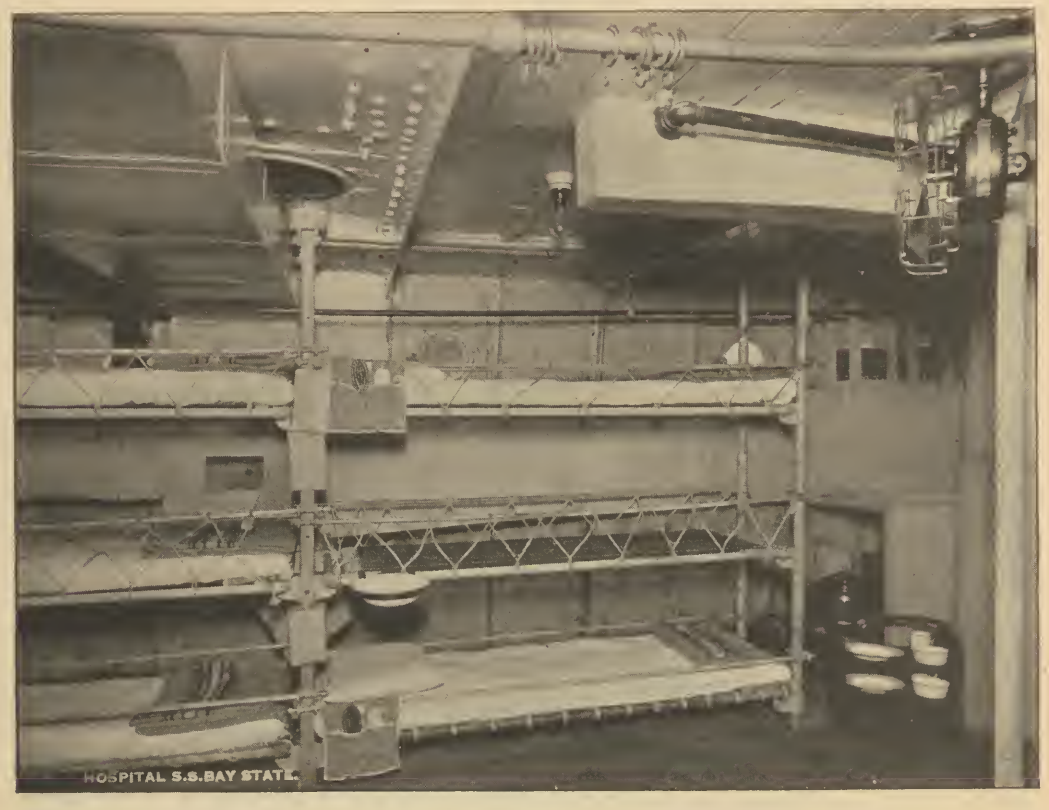

Fig. 9. Forward ward, showing three tiers of berths, with berths corded, beds made up, toilet bags and wash-basin in position.

The dimensions of three steamers fitted as hospital ships by the United States:

Creole. — Crowell Line. Constructed of steel. 358 feet long, 44 feet beam, 24 feet deep. Engines, 28″, 44″, 74″ x 54″ stroke. Built in 1896 by Newport News Ship Building Co. Gross tonnage, 3,801; net tonnage, 2,622. Fitted as a hospital ship for the United States Navy, and named the *Solace.*

John Englis. — Maine S. S. Co. Constructed of steel. 290 feet 8 inches long, 46 feet beam, 21 feet deep. Built in 1896 by the Delaware River Iron Ship Building and Engine Works. Gross tonnage, 3,095; net tonnage, 1,987. Fitted as a hospital ship for the United States Army and named the *Relief.*

Olivette — Plant S. S. Co. Constructed of iron. 274 feet 3 inches long, 35 feet 2 inches beam, 11 feet 9 inches deep. Built in 1887 by Wm. Cramp & Sons Ship & Engine Building Co. Gross tonnage, 1,611; net tonnage, 1,105. Army hospital ship.

What is known as the gross registered tonnage of a vessel is the internal capacity in cubic feet divided by 100. The net registered tonnage is the capacity less the cubic space occupied by the engines, boilers, coal bunkers, etc.

HOSPITAL SHIP "BAY STATE." (FIG. 1.)

The steamship *Bowden*, afterwards *Marmion*, was built by Scott & Co., of Bowling, Scotland, in 1886, and was used in the fruit business between Jamaica and Boston until purchased by the Massachusetts Volunteer Aid Association, by whom her name was changed to *Bay State*. The general dimensions of the ship are: Length, 200 feet; beam, 27 feet; depth, twelve feet, seven inches; gross tonnage, 776; net, 388. She had cabin accommodations for a few passengers. In fitting for a hospital ship the vessel was first cleaned thoroughly; the ballast, which consisted of granite blocks, was removed, the ceiling taken up, and the iron work of hull, both inside and outside, chipped, cleaned and painted. New ballast of pig-iron was put in, the old ceiling was thrown away and new fitted. The main deck, now termed the hospital deck, was smoothed up and sheathed with seven-eighths-inch tongued and grooved stock forward and aft of engine and boiler space. This deck was painted. After the first trip the passageways were covered with ribbed rubber. At sides of engine and boiler-bulkheads the iron deck was covered with cement and asphalt.

The forward ward extends from bulkhead forward of boiler space to bulkhead at forecastle; length about 66 feet; average width 24 feet; fitted for berthing 50 patients when two frames are used to a section. Two water-closets and one sink for this ward are located on port side, forward end. One bath-tub and two wash-bowls are located on centre line of ship near after end of the ward.

The after ward extends from bulkhead aft of engine-room to extreme stern of vessel; length about 68 feet; average width 24 feet; fitted for berthing fifty patients when two frames are used to a section. Four additional frames were placed in the extreme end known as the lazarette. Three water-closets and two sinks are located on port side; the bulkhead for isolated ward divides the water-closet room, so that one closet and one sink comes in isolated ward. The isolated ward bulkhead is about 48 feet aft of engine-room bulkhead with openings at port and starboard sides which can be closed with plates. This ward has space for 18 patients.

The starboard side of deck between the wards is fitted with four staterooms for baymen. The passage-way connecting wards is of sufficient width to allow for transfer of patients. The port side is fitted with operating-room, sterilizing-room and laundry. The laundry has door opening from the after ward. The sterilizing-room is entered through the laundry. Materials to be sterilized can also be put into the room from an opening in the deck, which is closed by a water-tight plate. The operating-room is entered from the forward ward.

The forward lower hold contains the coal bunkers for main boiler. From coal bunker forward, the hold is divided by a deck about nine feet below the hospital deck, called the orlop deck. Below this deck is fitted storerooms for ship stores. These rooms are built of wood slabs with about one inch spacing, fitted with doors. Openings to passageway between these storerooms are through hatches in the orlop deck.

FIG. 10. Aft ward, three tier construction, mess table and entrance to cold storage.

The orlop deck is divided with substantial wire netting into rooms for apothecary stores, clinical laboratory, surgical apparatus, linen stores, room for storing clothing belonging to patients, and the remainder fitted with berths for 20 patients.

The after lower hold is fitted with ice-making machinery, cold-storage rooms, ice tanks, ice-room, and fresh-water tanks. The ice-making machinery is separated from the rest of the hold by steel bulkheads, and the entrance to it is through the engine-room. This machinery was furnished by the Hendrick Manufacturing Company of Carbondale, Pa., of the type where the brine is cooled and taken from the cooler through the brine tanks. By this process no ammonia is taken outside of the space allowed for the machinery, making thereby one of the best plants for ship use.

FIG. 11. Isolated ward, two tier construction, bulkhead which can be put up shutting off ward from rest of ship.

The forecastle is fitted with iron berthing frames for the men, and with two mess tables. Berthing capacity for eighteen men.

The upper or main deck has steel deck-house forward containing six rooms. These rooms were occupied by the doctors and two of the engineers. On the port side forward of this house are two water-closets enclosed in a small steel house, which house also contains space for oils, paints, etc.

The main deck-house, which also covers the engine and boiler space, contains the first and second mates' room, two bath-rooms — one fitted with bath-tub, and one with shower-bath — with floors of asphalt. At the aft end of this house is the galley with dumb-waiter connecting with hospital ward. (Fig. 2.) The aft house on this deck contains five staterooms, two pantries, a cabin and a water-closet. Three of the five staterooms were used by the female nurses.

The pilot house and captain's room are on the bridge deck, which extends from forward end of forward house to stern of vessel. A strong galvanized rail with awning stanchions is fitted on this deck. Hatches are arranged over the hatches to the wards so that patients can be lifted from the hospital wards to the deck. Attached to the beams are hammock hooks for swinging hammocks. There is an awning to cover this entire upper deck. (Fig. 3.)

Sanitary Arrangements. — The waterways at sides of wards are cemented. Scuppers, 4 inches diameter, are fitted. All water-closets are of the Hercules type with tanks for flushing. (Fig. 4.) The closets are placed so that soil pipes lead through side of ship above water line, and are fitted with storm valves. The water service is from a pump which runs continuously, the overflow from tanks flowing through the closets. The baths are arranged with Gegenstrom heaters except the shower-bath. All plumbing is open.

Ventilation. — A large blower is located in upper engine-room. The suction pipes extend through the after and forward wards, with branch to lower between decks forward. Openings in pipes are covered with wire netting, and dampers are fitted to regulate the draught. The air is changed very rapidly. The discharge pipe extends up through engine-room skylight with delivery some distance above bridge deck.

The ice-machine room is ventilated by a pressure fan, outlet pipes running through upper and bridge decks.

About fifty-four electric fans are located throughout the wards, and one in each stateroom.

Hatches. — The hatch openings on main deck have iron frames with canvas covers, which are to be used in heavy rain storms. Hatch covers of wood are fitted so that in case of a violent storm they can be put in and battened down.

Lighting. — A direct connected engine and dynamo are located in the lower engine-room. The vessel is wired throughout. There are about one hundred and fifty lights. The fittings for lights are the same as for electric fans.

Fire Service. — Connection on deck from single pump, and outlets on water service pipes with hose to reach to any part of vessel.

General. — Vessel is fitted with steam windlass and steam steering gear, one alco-vapor launch, four life-boats, two rafts, and about one hundred and seventy life preservers.

The details of construction are all carefully worked out. All berth frames are of one size, 24 by 74 inches, and are interchangeable. The substitutes for side boards for berths are rods clamped to standards by a yoke. The serving tables are conveniently located in the wards, as are also the closets for linen, etc. The inside and outside of vessel received several coats of paint, and the final coats in wards were of enamel white.

There are side ports at main deck, two on starboard and two on port side, through which patients can be brought on board or taken ashore directly from the wards.

Appended are memoranda giving general dimensions of vessel, sizes of engines, etc.:

Principal Dimensions of Hull. — Length between perpendiculars 199.5 feet. Breadth, extreme, 27.1 feet. Depth 19.8 feet. Tonnage, measurement — gross 776.60; net 388.30.

Main Engines.—20″, 32″, 53″ diameter of cylinder by 36″ stroke.

Main Boilers. — Two, Scotch type, 11′ 5″ diameter x 10′ long. Two 36″ furnaces in each boiler; 143 pounds steam.

Auxiliary or Donkey Boiler.—One upright tubular, 60″ inside diameter, 9′ high, 54″ diameter furnace of 150 pounds steam pressure.

Windlass.—No. 4 Hyde 6″ x 8″, double engines.

AUXILIARY MACHINERY.

Pumps.— Bilge and ballast pump, Knowles duplex, 7½″ x 4½″ x 10″. Deck and fire pump, Knowles single, 7″ x 4″ x 7″. Distiller circulating, Blake duplex, 5½″ x 5″ x 6″. Donkey feed pump, Blake single, 7½″ x 4½″ x 10″. Fresh water distributing, Blake single, 6½″ x 4½″ x 8″. Evaporator feed pump, Blake single, 3″ x 1¾″ x 3″. Ice-machine circulating, Blake special duplex, 6″ x 5¾″ x 6″. Ice-machine brine, Deane duplex, 6″ x 5¾″ x 6″.

Dynamo and Engine.— Sturtevant type, direct connected. Engine 5″ x 4″ double vertical, 575 R. P. M. Dynamo multipolar 12,000 Watts at 110 volts.

Evaporator and Distiller Plant.—James Reilly Repair and Supply Co. Capacity 3,000 gallons in twenty-four hours.

Ventilating Fans.— One 70″ exhaust fan, Sturtevant, for ward ventilation. One 40″ pressure fan, Sturtevant, for ice-machine room ventilation.

Ice Machine.—Capacity 5 tons in twenty-four hours. Engine cylinder, single, 10½″ diameter x 15″ stroke. Compressor cylinder, single, 7½″ diameter x 15″ stroke.

Coal capacity, 166 tons.

Draught loaded, 9′ forward, 13′ 8″ aft.

Tanks, Fresh Water.— Fore-peak supply and trimming tank, 8,000 gallons capacity. After-peak supply and trimming tank, 2,500 gallons capacity. Two supply tanks in after hold, total 2,300 gallons capacity. One pressure tank for running water head, 250 gallons capacity. Ballast tank bottom from aft engine-room bulkhead, 48 tons capacity.

Tanks, Oil.—One tank for vapor launch supply, 210 gallons. Three engine supply tanks, 58, 58 and 55, 171 gallons. (Fig. 5.)

Sterilizing Machine for Bedding, etc.—4′ 6″ diameter x 6′ 6″ long.

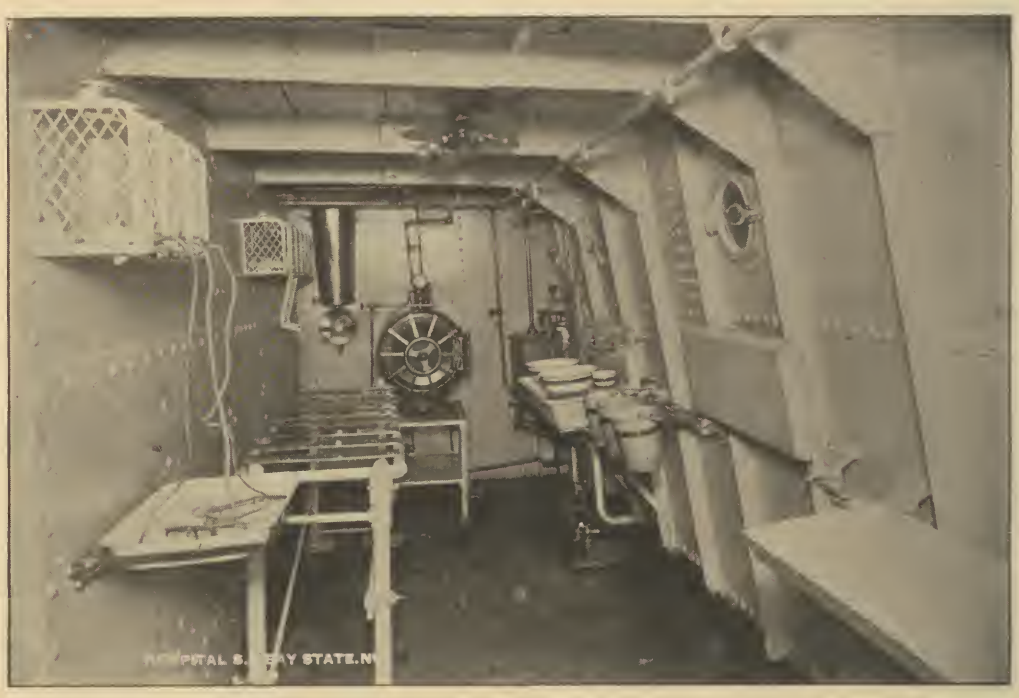

FIG. 12. Operating-room.

LAUNDRY MACHINERY. (FIG. 6.)

One 4″ x 4″ steam engine. One wooden machine 22″ diameter, 26″ long, rev. 160. One power wringer, rolls, 3¼″ diameter, 16″ long.

MEDICAL EQUIPMENT.

BY E. H. BRADFORD, M.D., BOSTON.

THE equipment of the hospital ship *Bay State* was planned with the idea that she should be ready for whatever emergency the chances of war might bring, with the chief idea, however, that she should serve as a hospital transport for the transferring of the sick to mainland hospitals and with preparations only for short trips. As she was visiting a country where yellow fever was to be expected, it was necessary that her construction should be such that it could be easily and thoroughly cleaned and fumigated. Wood con-

struction was therefore discarded and ironwork substituted. It was necessary that the ventilation should be good; that facilities for making ice, for furnishing pure water under all circumstances, and for furnishing delicacies for the sick be provided.

An operating-room, for any emergency which might arrive, was demanded. Although it was not anticipated that much surgery would be needed upon the ship, preparations were made for thorough asepsis and antisepsis, in case any was required. (Fig. 7.)

It was also thought advisable to arrange that the patient could, if necessary, be transferred from the ship to land without removal from the frame which serves as a bed. To make this possible, the gas-pipe berth frames, used for sailors in many of the recently built yachts and steamers, were made detachable. In place of the canvas stretched on the frame (making of it a flat hammock), a wire mattress was used, secured to both ends of the frame by means of screw-threaded rods fastened to the ends of the mattress on one side, and on the other to the cross rods of the frame. Any degree of tension of the mattress was secured by means of a screw nut, and, if necessary, the wire mattress could be removed. On the wire mattress a coir (African hair) mattress was placed. The frames were secured at the four corners by socket castings to four uprights fastened to, but detachable from, sockets screwed to the floor and ceiling. On these uprights suitable castings slid (secured by a pin at a required point), furnished with a strong hook, one at each of the four posts. On these hooks the mattress frame was placed. The construction of the frame was such that it fitted the hooks in such a way as to give no rattle or motion. The frames were sufficiently wide for an adult male. They could be readily removed from the back by lifting from the hooks, and if a patient lay upon them, the individual could be carried wherever it was desired without being removed from his bed. To prevent the patient from being thrown out, in case of rolling of the ship, a side rod was placed and secured at any desired height to each of the four uprights by passing through a screw clamp. Where more than one was necessary, a second one also could be placed, which would prevent the patient from slipping through, if such was needed. Cord lashings were also used for lashing the rod to the frame, to prevent the patient slipping under the rod. The upright rods were hollow and three inches in diameter; the frame made of gas-piping an inch and a half in thickness. The side rods were three-quarters of an inch solid rods. (Fig. 8.)

FIG. 13. Supply-room.

The arrangement of the berth stacks varied in the two wards according to the space, but in both, aisles were left sufficient in width for the removal of the patients. Arrangements were made for two or three tiers of frames, three if the vessel were crowded, and two under ordinary circumstances. The centre of the ward over the hatchway was partially floored in, and a serving table of wood was placed upon the hatchway. (Fig. 9.)

A hoistway was made with arrangements for hoisting the frames through the hatchway upon the deck, if that was desirable. The sinks and water-closets were separated from the wards by an iron sheathing, making a separate room. Standing bowls and bathtubs, screened by rubber hangings, were placed in each ward, supplied with Gegenstrom water temperature regulators. (Figs. 10 and 11.)

The operating-room was necessarily small, and was arranged so that the operating facilities should be in the most compact form. Instruments and dressings

Fig. 14. Linen closet.

were placed in a closet with iron wickerwork doors, and shelves of the same construction. Iron wickerwork cages were also placed for bottles of sterilized water. Iron frames were hinged to the wall, into which agate-ware trays could be placed for dressings or surgical instruments. These hinged frames could be folded up against the wall when not in use. The same is true of places for basins placed over an iron sink, and for sterilized solutions for the surgeons' hands. (Fig. 12.)

The operating-table consisted of an iron-piping frame resting when in use on two iron-pipe stands which were secured at the sides by side rods clamped onto the stands. Across the frame were placed flat plates of nickel plated steel four inches wide, and long enough to be hooked over the sides of the frame. When the plates were placed together a smooth surface was furnished, on which a patient could be placed,

Fig. 15. Clinical laboratory.

and which could be made aseptic, each plate being sterilized before operation by steam sterilization. Separating the plates permitted irrigation fluid to drain from the surface of the operating-table to a chute below, made by securing a rubber sheet to the sides of the frame cut so that it would slope into a pail below. Two operating-tables were furnished, to be taken apart and stacked at the side of the room when not used; a steam sterilizer for sterilizing dressings, a filter for water, and a steam water heating arrangement for boiling surgical instruments, an asphalt floor with a side gutter and escape pipe, and arrangement for hanging sterilized sheets to the walls of the operating-room, permitted as complete asepsis as was possible. The water faucets were arranged to work with the foot, instead of the hand. (Fig. 12.)

The ventilation of the wards was excellent, and was furnished by an exhaust system, made preferable in this instance over the plenum by the large hatchways; supplementary to this were windsails to the hatches in suitable weather and a large number of electric fans. An x-ray appliance was supplied in the forward ward. In the lower forward deck the apothecary service was arranged with the medical supplies and also an ample arrangement for the surgi-

Fig. 16. Pharmacy.

cal supplies. A clinical laboratory was also equipped here with facilities for the requisite tests. (Figs. 13, 14, 15 and 16.)

Any statement of the equipment of the *Bay State* would be incomplete without an expression of thanks for the enthusiastic help rendered by the different local aid associations and to different individuals, who generously supplied everything which could suggest itself as of possible benefit for sick soldiers, to say nothing of the personal work so lavishly expended by all.

THE METHOD AND CHARACTER OF WORK DONE BY THE MASSACHUSETTS HOSPITAL SHIP "BAY STATE."

BY HERBERT L. BURRELL, M.D., BOSTON.

On August 6, 1898, the work on the ship and its equipment being essentially completed, it sailed with the following medical department and complement of officers and crew:

Medical Department. — Surgeon-superintendent, Dr. Herbert L. Burrell; first surgeon, Dr. E. A. Crockett; second surgeon, Dr. J. T. Bottomley; purser, Mr. W. H. Seabury; first assistant surgeon, Mr. T. J. Manahan; second assistant surgeon, Mr. C. L. Spaulding.

Nurses. — Head nurse, Miss C. W. Cayford; Miss Janet Anderson, Miss Muriel G. Galt, Miss Anna M. Blair, Miss Sadie Parsons, Miss Sarah Fraser.

Baymen. — S. Hooker, F. P. Droese, L. L. Kemp, W. F. Lyford, Peter Salveson, N. E. Nichols.

Navigation Department. — Deck department, P. F. Butman, master; Charles Clare, first officer; William M. Swasey, second officer.

Quartermasters. — Solomon Bateman, George A. Gridley.

Boatswain. — Charles Brown.

Seamen. — William Offenberg, Harry Soutter, William A. Green, James Galligan.

Engineer Department. — Charles Lindgren, chief engineer; H. Kelly, first assistant; G. Anderson, second assistant.

Oilers. — Joseph Witzel, C. Keating, J. E. Born.

Firemen. — Joseph Fitzgerald, George Wiley, Thomas Norton, F. Flack, N. Carroll.

Steward's Department. — F. J. Leonard, steward; Louis Greaty, cook; William Gardner, second cook.

Waiters. — E. McApee, Harry Lepagle, Thomas Cronin and a mess boy.

It sailed under the following commission of the President:

[COPY]

This Commission Witnesseth, That the Massachusetts Volunteer Aid Association hereby is recognized by the Government of the United States of America as an Aid Society within the terms of Article XIII of the Geneva (Red Cross) Convention, during the pending war between the United States of America and the Kingdom of Spain; that said Association hereby is expressly authorized to fit out and equip at its own expense a Hospital Ship for all the purposes of such a ship during said war, said ship to be named "The Bay State" and that C. A. Siegfried, Medical Inspector of the United States Navy, hereby is authorized to have control of said Hospital Ship during her fitting out and on her final departure, and to issue his certificate as the proper naval authority under Article XIII of the Geneva (Red Cross) Convention aforesaid, that she had been so placed under his control, and that she is then appropriated solely to the purposes of her mission.

Given under my hand at Washington this 23d day of June, in the year of Our Lord, one thousand, eight hundred and ninety-eight, and in the 122d year of the Independence of the United States.

By the President.

WILLIAM McKINLEY.

JOHN D. LONG, *Secretary of the Navy.*

It had the following Certificate of Inspection:

[COPY]

CERTIFICATE OF INSPECTION.

By virtue of the authority vested in me by The President of the United States of America, and The Honorable Secretary of The Navy, I have the honor to certify that, after due inspection and full knowledge, the Hospital and Ambulance Ship "Bay State" equipped and to be maintained at the expense of the Massachusetts Volunteer Aid Association, of the State of Massachusetts, has fulfilled every requirement and obligation, in her equipment, stores, and personnel, of the Geneva (Red Cross) Convention (Art. XIII concerning the marine): and, that she is entitled to all the privileges, protection, and neutrality, accorded to hospital ships under that international agreement.

C. A. SIEGFRIED,
Medical Inspector United States Navy.

BOSTON, MASS., August 6th, 1898.

As an aid association hospital ship the problem of its control and government was unique. It required careful thought and consideration, and the Association was indebted to the services of Mr. Frederick Dodge and Commander Green, who carefully evolved a plan of control.

The title of surgeon-superintendent was selected as designating an official who would have not alone the medical charge of the ship but would represent the owners; for, as can readily be understood, the proper control of a hospital ship should be vested medically. And yet the difficulty arose of divided responsibility. It was clear that there should be only one captain on board the ship, for the exigencies and customs of the sea service demand that there shall be only one authority. In a way the position of the surgeon-superintendent was not unlike that of a supercargo of a vessel.

The surgeon-superintendent was given instructions by the Board of Control, Mr. H. L. Higginson, Mr. R. M. Burnett and Dr. H. L. Burrell,[1] placing the ship entirely in his charge, the safety of the vessel from the navigation standpoint to be in the hands of the master, and yet the point to which the vessel should go, the immediate control of the ship wherever influencing the welfare of patients, — in these the master was placed under the direction of the surgeon-superintendent.

The following articles were signed by all members of the medical department. The navigation department signed the ship's articles, under the master.

MASSACHUSETTS HOSPITAL STEAMSHIP "BAY STATE."

It is hereby agreed by and between Herbert L. Burrell, surgeon-superintendent of said hospital steamship, on behalf of the Massachusetts Volunteer Aid Association, and the several persons whose names are hereto subscribed, as follows:

(1) Said persons agree to serve in the several capacities below set against their respective names in the hospital service of said ship, and on board her, she being now bound from the Port of Boston to such ports or places as it may be found necessary to have her visit in the course of her employment for hospital purposes during the present war; provided, also, that if found necessary, she is to make continuous trips between such ports or places and ports in the United States as may be ordered, and back to a final port of discharge in the United States, for a term of time not to exceed three months in all from the date hereof.

(2) Said persons further agree to conduct themselves in an orderly, faithful, diligent and sober manner, and to be at all times obedient to the lawful orders of the surgeon-superintendent, or whoever may succeed him in that office, in everything relating to the hospital service of said ship; and to the lawful orders of the master of said ship in the exercise of his authority as master over all persons on board not members of her crew.

(3) In consideration of said service to be duly performed, said surgeon-superintendent hereby agrees to pay them for each and every month's service the sums below set against their respective names, and at the same rate for any time of service less than one month; and also to provide them (subject to the emergencies of said service) with suitable food and accommodations on board said ship.

(4) Unless sooner discharged as below provided, the said persons hereby each agree to serve as above during the continuation of the present war, and for such further time thereafter as may be necessary for the proper completion of the service in which she may be then engaged. But no person is to be hereby bound to serve as above for a longer term than three months in all.

[1] Dr. E. H. Bradford acted on the Board of Control during the absence of Dr. Burrell.

(5) It is agreed that said surgeon-superintendent, or whoever may succeed him in that office, may, whenever he shall deem it expedient for the interest of the service for which said ship is destined, discharge any of the persons signing this Agreement from service on board her, and terminate this Agreement as to such person, by giving such person one week's notice that he or she is so discharged, and that this Agreement is so terminated as to him or her. At the expiration of such notice, if said ship is then in port, or upon her arrival at the next port at which she may arrive after the expiration of such notice, such person shall leave the ship, and all his or her rights under this Agreement to further compensation or to further food and accommodation on board shall cease; except that, if such person's discharge from the ship as above takes effect at a port out of the United States, he or she shall be entitled to the reasonable expense of returning to the United States, and to wages at the rate herein expressed during the time reasonably necessary for such return.

Dated at Boston this first day of August, A.D., 1898.

Provision was made in these articles, as will be seen, for the dismissal for good cause of any of the members of the medical department, and it is interesting, as illustrating the wisdom of the articles of service as drawn up by Commander Green and Mr. Frederick Dodge, that during the successive voyages it was never necessary to refer to the Articles of Agreement. The authority was established at the start instead of being allowed to develop as occasion demanded.

Selected and elected to their respective positions, as the medical department were, out of an extraordinarily large number of applicants, it was and still is a matter of wonderment that they adjusted themselves so perfectly to the conditions which they met and to the individuals with whom they associated.

After sailing it became necessary to lie for some forty-eight hours in President's Roads to restore order out of chaos. The ship was broadly divided into two departments: (1) navigation; (2) medical. Under the navigation department were the engineers' and stewards' departments. The stewards' department was definitely assigned by the master of the ship, Captain P. F. Butman, to the purser.

The organization was simple. If any member of the medical department wished anything done in the navigation department or engineers' department, the request was made through the surgeon-superintendent. If any member of the navigation department wished anything done in the medical department, the request was made through the master of the ship. While the above was the rule, yet it was rare that it was carried out to the letter. It was difficult for those connected with the ship, both in the navigation and medical departments, to see the necessity for this provision.

The surgeon-superintendent received daily reports from the master of the vessel as to the quantity of fuel, water, position of the vessel, and the master of the vessel was directed to report at any time any imminent exigency that might arise.

The cleanliness of the ship was suggestively controlled by the medical department. The actual work was done by the navigation department, except in the parts of the ship, wards, etc., directly occupied by the patients.

The work of the various officers was as follows: The surgeon-superintendent had no specific duties, but was in charge. The executive officer, who was the first surgeon, was the one who carried out the directions of the surgeon-superintendent in the medical department. The second surgeon was in charge of the patients. Practically he was visiting physician. The first assistant surgeon was in charge of the forward ward, and the second assistant surgeon was in charge of the aft ward. The purser was in charge of all financial accounts and the stewards' department. The head nurse was in charge of the nursing. The baymen were under the direction of the visiting physician. The orders for their work were written in a separate book and while they were told that they must co-operate with the head nurse, yet they were not directly under her.

The division of work in the wards was that which exists in a well-regulated hospital. It was impractical in many ways to carry this out fully, yet the general spirit was that the ship was a hospital platform. As a supply ship it became necessary to know definitely the position of everything on board in order that when supplies were furnished their character and quantity should be accurately known. This work was largely done by the second surgeon and by the head nurse, who was acting property clerk. The financial interests of the ship were looked out for by the purser, in conference with the master and surgeon-superintendent.

The ship was obviously intended primarily for the care and well-being of Massachusetts troops; this, however, not to the exclusion of other volunteers or regular troops. She was specifically fitted out as a supplementary aid to the medical departments of the United States Army and Navy, and wherever any question arose as to what the ship should do, — for example, the transportation of caskets, the receiving of passengers, the moving of supplies, — all were decided after reference to what the ship was equipped for. It made it easy to make decisions, but at times they seemed unelastic and arbitrary.

The surgeon-superintendent had been provided with the following letters:

NAVY DEPARTMENT.

WASHINGTON, JULY 22, 1898.

SIR: — The Hospital Ship *Bay State* has been fitted out by the Massachusetts Volunteer Aid Association, and has been commissioned by the United States Government under the International Red Cross Convention. The purpose of the ship under the direction of its Surgeon-Superintendent, Dr. H. L. Burrell, is to aid the medical authorities of the Army and Navy of the United States in caring for the sick and wounded soldiers and sailors. You are directed to aid and assist the authorities of the *Bay State* as far as practicable. When they need coal and cannot otherwise obtain it, you are authorized to supply it, if it can be spared, taking a receipt in duplicate for the amount, and cash or draft on Lee, Higginson & Company, of Boston, in payment.

Very respectfully,
(Signed) JOHN D. LONG,
Secretary.

To commanding officers of United States Squadrons and Vessels.

WASHINGTON, D. C., JULY 22, 1898.

DEAR DOCTOR: — Permit me to introduce Dr. H. L. Burrell, Surgeon-Superintendent of the Massachusetts Aid Society Hospital Ship *Bay State*. He goes in charge of the *Bay State* to care for any sick or wounded of the Army or Navy.

I hope you will extend him all the facilities in your power toward the accomplishment of his good work.

Yours very truly,
(Signed) W. K. VAN REYPEN,
Surgeon-General, U. S. Navy.

C. M. GRAVATT, U. S. N., *Fleet-Surgeon, U. S. Flagship New York.*

WAR DEPARTMENT.

WASHINGTON, JULY 22, 1898.

SIR: — The Hospital Ship *Bay State* has been fitted out by the Massachusetts Volunteer Aid Association, and has been commissioned by the United States Government under the International Red Cross Convention. The purpose of the ship, under the direction of its Surgeon-Superintendent, Dr. H. L. Burrell, is to aid all the medical authorities of the Army and Navy of the United States in caring for the sick and wounded soldiers and sailors. You are directed to aid and assist the authorities of the *Bay State* as far as is practicable.

Very respectfully,
(Signed) R. A. ALGER,
Secretary of War.

To the officers commanding U. S. Troops.

WAR DEPARTMENT.

SURGEON-GENERAL'S OFFICE,
WASHINGTON, AUGUST 2, 1898.

To the Officers of the Medical Department, U. S. A.:

Gentlemen, — The Hospital Ship *Bay State*, having been equipped and fitted out by the Massachusetts Volunteer Aid Association, is in charge of the Surgeon-Superintendent, Dr. Herbert L. Burrell, and I have requested him to render such supplementary aid and assistance to you as may be required.

Very truly yours,
(Signed) GEORGE M. STERNBERG,
Surgeon-General, U. S. A.

The method adopted of rendering aid to troops was in general as follows:

First, some officer of the medical department of the ship reported in person to the ranking officer in the army or navy who was present, that the ship had arrived, presented her credentials and asked for suggestions as to the manner in which they could render aid. Second, an officer of the medical department of the ship placed himself in communication, for advice, suggestions and directions, with the chief medical officer of the army or navy who was present. As the ship was not under the direction of either army or navy, and had a roving commission, the advice, suggestions and directions received from these various sources were considered and a line of action was adopted. There were many distinct advantages connected with the position of the ship. The natural self-interest of an organization would frequently deflect it from giving advice as to where the ship could be most useful, which was obviously the function for which she was equipped.

However, one principle dominated the aid rendered by the ship and it was this: to find out as far as possible what was needed by the authorities in charge, and to co-operate with them in every way possible, to render them assistance in the way in which they wished. It became very clear that the best way to assist them was to do what the authorities in charge wished and not what the surgeon-superintendent might consider necessary and best. In a few instances it was necessary to disregard constituted authority.

A great deal of work was done by the pathologist of the ship, Dr. Cabot, who accompanied the ship on her second voyage, in the general hospital at Ponce and Guanica.

The designation of what patients were to be taken was at times difficult and complicated. In a few instances an effort was made to press upon the ship unsuitable cases, but this was due to a desire on the part of the medical authorities to relieve a condition which seemed to them unbearable. However, in all instances where patients were taken, they were definitely assigned to the care of the ship by the chief surgeon of the military district.

Wherever it was possible, identification papers were sent with the patients, and when we reached the home port the patients were disposed of by being assigned nominally to a representative of the United States Army. Substantial records were kept of the patients, and the following is the form of blank that was used for histories:

HOSPITAL SHIP "BAY STATE."

Name Date
Age Native of No. Berth No.
Grade
Address
Address nearest friend
Received from
Disability
How and where received
Date
Discharged. Condition
Delivered to
Medical record

Surgeon in charge.

A discharge card was also given in every instance. This was for the purpose of identification, to prevent frauds, and to enable the patients to bring legitimate claims against the Government. On reaching the home port duplicate medical histories of patients were made out and were forwarded to the representative of the United States Government to whom the troops were nominally delivered, with the request that these records be delivered, through the proper channel, for deposit in the Surgeon-General's Office in Washington.

The ship did work in three different directions: (1) She brought home 336 patients. Of that number five died. The percentage of mortality was 1.49 per cent.; subtracting a patient who died before leaving Santiago Harbor, this reduces it to 1.19 per cent. This work was carried out at Guantanamo, Santiago, Caimanera, Guanica, Ponce, Arecibo, Utuado and San Juan. (2) She gave medical and surgical supplies to patients at all of these points. She supplied with many essentials a yellow fever hospital at Santiago and at Siboney; furnished a number of supplies at Utuado; essentially equipped a hospital of seventy beds at Arecibo and of eighty beds at San Juan; furnished a large amount of supplies at Ponce and Guanica; relieved starvation at Caimanera; furnished supplies at Guantanamo, and incidentally furnished necessities and luxuries to vessels of the United States Navy. (3) On the first voyage to Porto Rico it was found that the problem of caring for the sick of the Sixth Regiment was a difficult one, and it was determined to leave the seriously ill patients at Utuado, owing to the difficulties arising from the transportation from Utuado to Arecibo. The ship at this time took essentially all the convalescent patients of the regiment and left as a supplementary aid to the medical department of the 6th Regiment, under the direction of the medical agent of the Massachusetts Volunteer Aid Association, Dr. J. Booth Clarkson, who afterwards acted as purser of the ship, and the following nurses and baymen: Miss Parsons, Miss Galt, Mr. Kemp and Mr. Lyford. (4) The mental influence of the ship should not be lost sight of. It was distinctly a sense of encouragement to troops, especially the officers, wherever she went. The sense of encouragement in many instances was so marked that it, figuratively speaking,

placed men on their feet and enabled them to carry on their work. The following quotation from a letter of Major L. C. Carr's expresses this mental influence: "Is like a ray of hope in a desert of desolation." She was always welcomed wherever she went and it was a rare pleasure that was afforded to the officers of the ship to act as the dispensers of the charity of the Massachusetts Volunteer Aid Association.

THE MEDICAL AND SURGICAL HISTORY OF THE HOSPITAL SHIP, "BAY STATE."

BY J. T. BOTTOMLEY, M.D., BOSTON.

PERHAPS not the least interesting and instructive of the developments of the late war was the work done by hospital ships. Both the army and navy possessed such ships as adjuncts to their regular medical service and found them invaluable. Attached to neither, but co-operating with both, was the hospital ship, *Bay State*, sent out by the Massachusetts Volunteer Aid Association.

It may add to the interest of her history to know that the sending out of this ship was an unique occurrence in two particulars: she was the first hospital ship in the world to be fitted out by an aid association and authorized by a sovereign power under the articles of the Geneva Conference; she was the only hospital ship in the late war sent out by the people of any State to care for its soldiers — a distinction that added to the already great fame of Massachusetts, and made her soldiers the envy of their less fortunate brothers.

Under the auspices of the Volunteer Aid Association the *Bay State* made three trips to and from Cuba and Porto Rico and was in active service about three months, during which time she received on board, as patients, 336 soldiers. To care for these she carried on her first trip five physicians, six nurses and six baymen; on her second, six physicians, six nurses and eight baymen; on this trip two of the nurses and two baymen were left in Porto Rico to aid in the management of the hospital of the 6th Massachusetts Regiment at Utuado; on her third trip she carried four physicians, six nurses and six baymen. These comprised the working medical force of the ship.

The first consignment of patients was made up of 101 men of the 2d and 9th Massachusetts Regiments— 40 from the 2d and 61 from the 9th; these were received at Santiago, Cuba, in August of the present year. The second and third consignments came from Porto Rico in September and October; the second consisted of 100 and the third, of 135 men. Of these 235, 207 were from the 6th Massachusetts Regiment, 25 from the 1st U. S. Volunteer Engineers, 2 from the U. S. Hospital Service and 1 from the 5th Light Artillery.

We naturally preferred to have Massachusetts soldiers as patients, because the boat was fitted out and supported by Massachusetts people and money; but when sick Massachusetts men were not to be found we were glad to receive and care for the sick of other States, as well as of the regular service. Of our 336 patients, 321 lived in Massachusetts, 7 in New York, 3 each in Pennsylvania and Maryland, 1 in Connecticut and 1 in New Jersey.

All these patients were received in tropical climates after they had been there from six to sixteen weeks. Our work was to take the men and care for them until they were delivered to the proper authorities at whatever point it was deemed expedient. All of our patients were landed at Boston.

In the 336 patients whom we carried, the following diseases were represented:

Malaria and Complications. — Acute, 34; convalescent, 32; with chronic diarrhea, 14; with dysentery, 16; with yellow fever (convalescent), 5; with phthisis, 1. Total, 102.
Typhoid Fever.— Acute, 20; convalescent, 53. Total, 73, including post-typhoidal abscess of thigh, 1; of parotid, 1; post-typhoidal neuritis, 3.
Diarrhea.— Acute, 55; convalescent, 42; with malaria, 14; with neurasthenia, 1; with tonsilitis, 1. Total, 113.
Dysentery.—Acute, 16; convalescent, 9; with malaria, 16. Total, 41.
Yellow Fever.— Convalescent, 16.
Rheumatism, 7.
Scattering.— Gonorrhea, 4; debility, 4; febricula, 4; hernia, 4; bronchitis, 3; gastritis, 2; phthisis, 2; after-effects of sunstroke, 2; syphilis, 1; sprained ankle, 1; varicocele, 1; septicemia, 1; myelitis, 1; cardiac, 1; cervical adenitis, 1; flat-foot, 1; paresis of extensor muscles of hand, 1. Total, 34.

The foregoing table demonstrates that of the 336 patients, 102, or 30.36 per cent., had malaria; 73, or 21.73 per cent., had typhoid; 113, or 33.63 per cent., had diarrhea; and 41, or 12.2 per cent., had dysentery. Considering dysentery and diarrhea together, they affected 154 of the 336 patients, or 45.86 per cent. This means that 45.86 per cent of the patients as they came on board had some degree of diarrhea or dysentery; yet these figures do not convey a fair idea of the prevalence of intestinal affections among the troops. Almost every northern soldier who was sent to Cuba or Porto Rico had a more or less severe attack of diarrhea during his stay there. Improper food, its improper preparation, the failure of the men to grasp the great importance of boiling all drinking-water and the careless use of tropical fruits, all aided in producing a disastrous effect. When you add to this the necessary exposure to wet and dampness, without the possibility of exchanging wet clothing for dry, the prevalence of intestinal inflammation is not remarkable.

There is one striking fact brought out by the table and one that speaks for itself of the general *morale* of Massachusetts soldiers. It is the very small number of cases of venereal disease among the men. There were but four cases of gonorrhea and one of syphilis. This is all the more remarkable when we consider the low standard of morality among the natives in both Cuba and Porto Rico. Of course, these men were ill, and, perhaps, in them the chance of exposure was less; but, even granting that, the percentage, under the conditions, is low.

Let us now consider the diseases of the patients brought from Santiago on the first trip as compared with those of the men brought from Porto Rico on the second and third trips.

Of the 101 brought from Santiago, 81, or 80.2 per-cent., had malaria in some form; but 16, or 6.81 per cent., of the 235 from Porto Rico showed malaria. These figures probably place the percentage of malaria in Porto Rico too high; for some of these 16 cases were doubtful. Blood examination of 106 patients, among whom were these 16, showed the plasmodium only twice. Again, Dr. Cabot examined the blood of at least 100 patients in the military hospitals at Guanica and Ponce, and did not find the plasmodium once — a fact which makes it very probable that malaria was comparatively rare in Porto Rico among the soldiers. The diagnosis of malaria is put down for them out of deference to the regimental surgeon, who had far

greater opportunity of observing them than we, and who had already made this diagnosis.

Eight of the Santiago men had typhoid fever, a percentage of 7.92 per cent., while 63 of the Porto Rican patients showed it, a percentage of 26.89 per cent. It is probable that more cases of typhoid would have been discovered among the Santiago men had it not been for the peculiar behavior of our typhoid cultures on the first trip, which rendered the doing of the Widal test impossible. This forced us to make the diagnosis of typhoid on clinical features alone.

The percentages of the patients with diarrhea do not, as has been noted above, convey a fair notion of its prevalence. Eighteen, or 17.82 per cent., of the Santiago men had dysentery; 23, or 9.79 per cent., of the men from Porto Rico showed it. Examination of the stools for the *amœba dysenteriæ* was very difficult on ship board. Some were examined on the second trip; the examination was negative but not satisfactory. At the hospitals in the city a number of cases of amebic dysentery were found among the patients from Santiago. As far as I know, but one such case was found among the Porto Rican patients.

The 16 cases of yellow fever received at Santiago were convalescent. The diagnosis had been made by the regimental surgeons. The histories of the men did not seem to point to yellow fever but rather to malaria. However, the men who made the diagnosis had observed the whole course of the illness of these patients. Several of the cases showed a peculiar yellowish discoloration of the finger-nails, which, according to Dr. McCollom, might come after yellow fever. There were no cases of yellow fever among the patients from Porto Rico.

The above facts show well the difference in the healthfulness of the two climates. Malaria was very prevalent and of an extremely severe type at Santiago; it was very uncommon in Porto Rico, and the two undoubted cases that we had an opportunity of seeing there were very mild. Typhoid was apparently more prevalent in Porto Rico, and the type was sometimes very severe, the victims often dying from the sixth to the tenth day; in fact, autopsy would show the pathological changes in the lymphoid elements of the bowel to be in the stage of hyperplasia, there being no sloughing or necrosis. We were told that before the advent of the soldiers in Porto Rico typhoid was comparatively unknown. The soldiers brought it with them. Seventeen fresh cases of typhoid developed on the *Yale* when she was carrying the 6th Massachusetts to Porto Rico. Dysentery was much more common in Santiago and was more severe than that seen in Porto Rico. It is not within our province to attempt to explain why there was less sickness in Porto Rico than in Santiago. The climate of the former is surely more wholesome and the war was older when the campaign there began and, hence, there was more time to make preparations for protecting the health of the soldiers. Whatever the reason was, the men in Porto Rico were in a much better condition physically than those in Santiago; from the latter came the sickest-looking and, indeed, the sickest, men we had ever seen or ever expect to see. The marked muddy pallor, the great emaciation, the sunken eyes, the starved looks and the terrible weakness, which was so manifest, made a picture that cannot be adequately described. Even the men said to be fairly well looked to us sick. It was war in its most terrible aspect, shorn of all its pomp and glory, clothed in all its wretchedness and misery.

The malaria at Santiago was all of the continued and remittent type; the crescent form of the organism was present in all the cases from that place. We found the organism of the tertian form but once, and that in one of the Porto Rican patients. At Santiago the men with malaria were many of them very ill, and these cases bore a strong resemblance to typhoid fever. The temperature was irregular, but the remissions were greater than are usually seen in typhoid and did not come at definite intervals; the typhoidal facial expression was common; the spleen was enlarged but was apparently more firm than the typhoid spleen. Cachexia and anemia were marked. Malarial edema was not common but was present in several instances. Chills were not seen in all cases. Paroxysms, when they came, usually occurred in the afternoon. Co-existing diarrheas and dysenteries often complicated the diagnosis and treatment of these malarias. There were undoubtedly some instances of double infection with malaria and typhoid; this was proved afterwards at the hospitals here. The behavior of our typhoid cultures on the first trip prevented the possible discovery of the fact on the ship.

When we obtained our first stock of typhoid cultures on agar and serum they came from a perfectly reliable laboratory, and the tubes, stoppered with cotton and sealed with paraffine, were delivered in a practically air-tight jar. Ten days later, when the Widal reaction became of importance, we found that all cultures made from these were either sterile or contaminated. This misfortune we ascribed to our lack of skill and technique and to draughts of air from a windsail. The stock on the second trip came from a different source and was on agar; the tubes, stoppered with cotton and unsealed, were placed in a box covered only by paper; they were not touched for ten days; then, with the same technique, etc., in planting cultures, the results obtained were very satisfactory; the tubes not used on this trip were preserved. Fresh agar cultures were taken on the third trip and were again placed in the glass jar. When we came to use them most of them were again sterile; some were contaminated; none were useful, though, from external appearances, they seemed to be all right. Then we fell back, as a last resort, on the tubes kept over from the second trip, which were at that time over six weeks old. Again, the conditions and the technique remaining the same, these cultures gave excellent results. The cultures on the first and third trips came from the same source, and, when received, were apparently in good condition and showed a growth. The interesting points are: the apparent effect of the air-tight jar on cultures of the typhoid organism; and the very lively growth obtained from the second cultures after they were six weeks old.

The cases mentioned in the table as febriculæ formed an interesting class. They were very common in Porto Rico, and were said to have been common in Camp Alger. As far as we could learn from the four patients we had, the prodromal symptoms were like those of typhoid, though the period of incubation was not so long, being only two to three days. The most distressing symptom was pain in the back — and patients complained chiefly of that. Diarrhea and headache were usually present. The temperature ran between 102° and 104° for three or

four days and then fell by lysis. An urticaria, which itched intolerably, usually accompanied the fever; while this was not the only condition in which urticaria appeared, yet it was more common with this than with the other fevers. It appeared usually in the giant form and covered irregular areas of considerable size on various parts of the body. The urticaria usually passed away with the fever. The blood of these patients did not give the Widal reaction, and whether the fever was due to a gastro-enteritis, to heat or to exhaustion — all of which were advanced as causes — we could not decide.

Blood Examinations. — The number of very ill men in our first consignment, and the amount of attention they demanded, made it possible for us to examine the blood of the sickest patients only. Fifty-six examinations were made for the *plasmodium malariæ*, and the crescent form was found in 49; 7 examinations were negative. On the second trip, with an increased medical force and fewer sick patients, 100 Widals and 100 examinations of blood for the plasmodium were done. Ninety five of the Widals were negative and 5 positive. Ninety-eight of the examinations for the plasmodium were negative and 2 positive — one showing the crescent form and one the tertian. Dr. Richard Cabot was of the greatest service to the ship on this trip. On the third trip, because of the loss of two members of the medical staff, we could do only such work on the blood as seemed necessary. Fifteen Widals were done, 11 of which were positive and 4 negative; as many examinations for the plasmodium were made, and all were negative. There are some difficulties about the use of a microscope at sea. Of course with the motion of the boat — and there is a good deal of motion in a small boat — the light was constantly changing and it was difficult to focus. If we used artificial light we had to work below decks, where it was exceedingly hot and uncomfortable. It was sometimes difficult to keep either ourselves or the microscope upright.

Surgery. — Though we were well equipped for surgical work, we did but little of it because of the cessation of hostilities. On this account, our surgical work was limited to the opening and draining of two abscesses.

Treatment. — First, of ourselves. It is notable that the medical department of the ship, aside from casualties and sea-sickness, was never incapacitated by illness. As a matter of precaution we all took four grains of quinine every morning while in Cuba. After any unusual exertion or after a trip ashore the dose was repeated and supplemented by a cup of coffee. We worked as little as possible in the heat of the day — that is, from 11 A. M. till 3 P. M. Contrary to all the principles of temperance, we never drank water when ashore. Fruits, except those carried from the north on the boat or those to which we were accustomed, were not allowed. Plenty of rest was one of the maxims. Except when the good of the ship demanded it, no one was allowed ashore after one hour before sunset. Our drinking-water was distilled from sea-water, and even the water in Santiago harbor, which was unquestionably foul, and where there is practically no tide to float the sewage, etc., away, was used by us for purposes of distillation. Some few cases of moderate diarrhea among the medical staff followed the use of this water. While the general trend of opinion among the dwellers in hot climates seems to be against sleeping at night in the open air, yet a number of the medical force of the boat did so more or less constantly, and apparently suffered no ill effects. However, sleeping in the berths on straw matting was usually not intolerably uncomfortable. When we were at sea the decks were washed down with sea-water every morning. When we were in infected harbors this process was entirely omitted. Washing of the floor about the serving tables in the wards was allowed then but once a day, and that with fresh water only. These measures were taken on the advice of some of the medical officers of the navy. They were necessary in Cuba, but not in Porto Rico.

Treatment of Patients. — While not coming exactly under the head of treatment of patients, it may not be amiss to speak here of the method employed in treating their clothing and personal effects. When a patient reached the ward after his corrosive bath he wore a suit of new pajamas. The clothing he had worn and all his personal effects that could not be injured by exposure to steam were placed in numbered canvas bags and passed through the deck into the sterilizing room. Here they were subjected for twenty minutes to steam at 340° F., under twenty pounds' pressure. All articles not sterilized by steam were placed in a box and disinfected by formaldehyde gas. Schering's lamp, with pastils, was used. The wards were disinfected by formaldehyde and thoroughly washed after each trip.

Diets. — Diets were divided into three classes: (1) liquid, (2) soft solids, and (3) ship's diet. The following articles were contained in these:

(1) *Liquid.* — Beef tea prepared from either the extract or juice, clear soups, clam juice, malted milk, Mellin's food, tea and coffee occasionally.
(2) *Soft Solids.* — Bread, puddings, eggs, oatmeal, ice cream.
(3) *Ship's.* — Soup, meats, potatoes, desserts, ice cream, fruit.

Drug Treatment. — Comparatively few drugs were used. Malaria was, of course, treated by quinine. It was usually given in 8-grain doses three times daily. Cases which did not do well under this treatment were given half-ounce doses of Warburg's tincture; the change worked very well in two or three instances. The very sick cases — those in whom vomiting was a prominent symptom or whose stomachs would not tolerate quinine — were given 15-grain doses of the bisulphate with tartaric acid subcutaneously. The anemia and cachexia were treated by Fowler's solution or by the iron, arsenic and strychnine tablet. Where arsenic was contraindicated, reduced iron was used. Steady high temperatures were treated by cold sponge baths. The hardest cases to treat successfully were those complicated by diarrhea or dysentery.

The treatment of the diarrheas varied. Mild cases, having four to six movements a day, were treated simply by a restricted diet — usually the liquid; in two or three days the diarrhea generally gave way to constipation. No drugs were given these cases. Whether the resulting constipation was the effect of the sea-air — which, some hold, is decidedly constipating — or of the rest and restricted diet matters not. Somewhat more severe cases were treated by bismuth or by the opium, camphor and tannin tablet in addition to the restricted diet. Severe diarrheas and the dysenteries showed but very little improvement under the use of drugs by the mouth. Opium was always given in these cases, but it was supplemented by large high enemata. Quinine in the proportion of thirty grains to two quarts of water, and nitrate of silver in the pro-

portion of twenty grains to two quarts of water, were both used. One worked well in some cases, the other in others, but on the whole the quinine enemata worked more satisfactorily.

Typhoid fever was treated in the usual way. Cold sponge baths were given when the temperature required it. The diet was limited to liquids, with soft boiled eggs occasionally. The drug treatment was not unusual. Bedding that was infected was thrown overboard. After each trip all bedding, bed-pans, etc., were sterilized by steam. Rubber sheets, etc., were washed in carbolic-acid solution. All stools were disinfected with chloride of lime and carbolic acid, and the bed-pans and urinals carefully cleansed after their use. The water-closets were closely watched; chloride of lime was freely used, and flushing with corrosive was a matter of daily routine. Closets were inspected twice daily. Pails of corrosive solution, for disinfection of the hands, were always in the wards. All these precautions were taken to minimize the danger of contracting or spreading infection.

Most of the men, as they came to us, looked pale and weak. Such men we tried to tone up by iron, strychnine, etc. All had marvellous appetites, and it was difficult to restrain even the sick from over-eating; this was particularly true of the men from Santiago.

All patients who were able to be out of their berths were kept on the upper deck as much as possible on suitable days. Here in their steamer-chairs under the awnings they drew in large doses of the best of tonics — pure, fresh air. No patient was allowed to leave the wards after sundown. Even on days when the convalescents could not leave the wards — and these were fortunately few — the wards were not uncomfortable. A chart of the temperature, as indicated by a thermometer hung in the pilot-house on the upper deck and by thermometers hung in the wards, showed an average temperature of 80° F. on deck and of 85° in the wards. This represents the average temperature while the ship was in tropical waters on her third trip.

Mortality. — Of the 236 patients five died — three of the Santiago men and two of the Porto Rican. One of the Santiago men died before we left the harbor, and two more the first night out; all three men were desperately ill when brought on board; the cause of death was either typhoid or malaria complicated by dysentery. One of the Porto Rican patients died of typhoid fever; the other of transverse myelitis; one came to us in a state of collapse, the other with complete paralysis of his lower extremities and of the muscles controlling the bladder and rectum. The total mortality was 1.49 per cent. The mortality among the Santiago men was 2.97 per cent; among the Porto Rican patients .85 per cent. The percentages given represent simply the mortality among the patients while on the boat. A number died in the hospitals after reaching Boston. In fact, some of the men who, while on the boat, ran normal temperatures and spent most of their time on deck were afterwards admitted to the Boston hospitals seriously ill with amebic dysentery or malaria, and several of them died.

The patients, in general, improved very much during the voyage; in fact, it can be said that all, those who died excepted, left the ship in much better condition than when they came aboard her. The malarias complicated by diarrhea or dysentery improved the least. Drugs and the attending physician played a comparatively small part in bringing about this improvement. The pure, bracing sea-air, the good food and careful dieting had much to do with it. But the great factors were two: first, the splendid work of the nurses and baymen. Too much praise cannot be given to them. Under the most trying circumstances, and under conditions that were often most disagreeable and distressing, these women and men rendered magnificent service; they were able, willing, tireless and uncomplaining. It is only their just due to say that very much of the success of the hospital ship was due to her excellent corps of nurses.

The mental effect produced by the fact that they were homeward bound was the other great factor. Sick men who would have died without a struggle in the camps and hospitals took a new grip on life, and were filled with a determination to live when they realized that every throb of the engines brought them nearer to Massachusetts and home. One cannot well describe the effect of such a thought on men, but one can see despair give way to hope, and resignation to resolution — that must have its effect upon disease.

The good accomplished by hospital ships in the late war, and their valuable services to the sick of both the army and navy, assure them a place in the war of the future. The time when it was considered humane and just to carry sick on ill-fitted transport ships has passed. Note the great mortality among the men carried north from Santiago on transports. And yet this should occasion no surprise; for transports had not the conveniences either in berths or medical supplies; they were officered by men not in the regular military service, to whom the requests and advice of the physician is of small import and from whom no redress is obtainable. Let the transport remain for the well and strong, but let the properly fitted, well-officered and well-stocked hospital ship be considered the only humane way of carrying the sick and wounded.

Yet even hospital ships are not without their limits and disadvantages. There is somewhat less working room on them than in the land hospitals; this, however, is of small importance, for one soon becomes accustomed to working in limited quarters.

Sea-sickness, as far as we could observe, had no marked ill effect on the patients. Less than 10 per cent. were affected after the first twenty-four hours out. Of course, some patients were unable to take much food or medicine by the mouth for twenty-four hours. Fortunately, whether by chance or otherwise, our sickest cases were but little affected. It is possible that after abdominal operations the vomiting of sea-sickness would be a very unpleasant feature; but, on the whole, sea-sickness is not a marked disadvantage.

Diagnoses were sent with the patients in a good proportion of the cases; but we rarely received any history of the cases, of the run of the temperature, or of the previous treatment. We depended solely on what we could learn from the patient and what we could see for ourselves. This was not ideal. The defect, however, is capable of easy amendment. It should be a matter of routine that with each patient there should be sent a short résumé of his case.

The factor that limits most — and it limits it seriously — the use of a hospital ship is the problem of getting patients to the ship without doing them serious or even fatal harm. What class of patients can hospital ships take and take safely? If all military

camps and hospitals were on the seashore, with good docks and landings convenient, hospital ships could handle with safety any class of patients with almost any degree of sickness. But unfortunately camps and hospitals must sometimes be inland, and the route to the sea must often be long and difficult. When disease invaded the United States Army in the tropics there came a cry from the friends of the soldiers to get the sick men north. It was a very natural but often a thoughtless call. Undoubtedly lives were sacrificed by the unnecessay moving of patients. Consider for a moment the actual conditions: At Santiago the patients we received had to be brought in army ambulances over from four to six miles of rough, rocky road, and then were only at the docks whence they had to be moved first to boats and then to the ship. All this consumes energy — priceless to men as sick as they. Again, accidents may happen. Ambulances were said to have broken down and even overturned when bringing the sick to the dock, and that meant delay and more moving. In Porto Rico transportation over eighteen miles of wretched road was necessary. In this eighteen miles were six or seven fords, which in an hour's time might have become impassable rivers — streams in that country rise from four to six feet in an hour. The possibilities may be imagined. Under such circumstances, is it at all wonderful that we received many men in a state of complete exhaustion and some in a state of collapse? The greatest judgment must be exercised in selecting cases for hospital ships. It is questionable whether it is not much better for very sick men to remain at a fairly good hospital, even in a tropical country, than to be carted over six to eighteen miles of rough road in order to reach even excellent hospital ships.

On the other hand, a hospital ship should not be turned into a mere transport by filling her up with convalescents — men who are practically well. Errors of judgment will creep in, however, and if they must be made, let them be rather in the direction of taking convalescents than of taking men who are too sick. For in taking the former you do no injury to the men themselves, and you aid the regimental surgeon by taking just so many men off his sick call and giving him so much more time for his hospitals.

In one way the *Bay State* did not have the opportunity of showing her entire usefulness. Had she been near the scene of an engagement the ship could have been of great assistance in caring for the wounded. Even if they were too far away for immediate transportation to the ship, yet, with our facilities for making a temporary shore camp, with our large store of surgical supplies and apparatus, we could have rendered good service. We would have been at our best, perhaps, if an engagement had taken place in our immediate neighborhood, for the ship had a fully-equipped operating-room, in which were two operating-tables and all facilities for doing aseptic surgical work.

As we look back on the whole incident, the thing, perhaps, that gives us the greatest pleasure and satisfaction is the fact that we never have heard of a patient complaining of his treatment while on the *Bay State*. The men were usually courteous and invariably grateful for even the slightest attention. We cannot but feel that any effort we made or any time we gave has been fully repaid by their appreciation.

THE DUTIES AND WORK OF THE PURSER OF THE MASSACHUSETTS HOSPITAL SHIP "BAY STATE."

BY MR. W. H. SEABURY, BOSTON,
Volunteer Purser.

You have paid me a great compliment in inviting me to appear before you this evening, to give you some idea of what my duties were as volunteer purser of the hospital ship *Bay State*.

I did such a small amount of work on the ship, in comparison to what others did, that I have found it rather difficult to make a paper containing anything of special interest. I said to Dr. Fitz that this would be an entirely new departure for me, but I felt that if I could say anything that would be of the slightest interest to you all I ought not to decline the polite invitation. He wishes me to tell you what I had to do, what I had to do with, and how I did it.

WHAT I HAD TO DO.

Make myself generally useful to our surgeon-superintendent, Dr. Burrell. Take charge of all the finances of the ship. Purchase all the supplies (those relating to the hospital department excepted). Pay all bills, wages of crew, etc. Receive requisitions for supplies of all kinds, from hospitals and troops, have them approved by the surgeon-superintendent, see that they were delivered and receipted for. To keep a general idea of what food supplies we had on hand, and say whether we could spare them from our stores or not. Receive the patients on shore in tents, or on the main deck of the ship. Give each one a number, take their names and temperatures, also their valuables. All this was recorded by me in a book at the time.

When a requisition for supplies was received (and nothing was delivered without a written requisition), it was divided into three different lists, one for medical supplies, one for clothing, and one for the food. These were handed to the heads of departments, and they saw that the articles were issued and turned over to me. I saw them delivered and receipted for.

WHAT I HAD TO DO WITH.

Everything in a commissary's department that I could think of or that others could suggest. I was not limited as to expenditure, nor hampered in the slightest degree. My instructions were, obtain what you think best, and have it all of the first quality. And what pleasure it was for me to labor under such instructions!

The food supplies were stored in six of the eleven large storerooms, or lockers, in the lower hold, the other five being used for a part of the hospital supplies. On the deck over these storerooms there was a large space enclosed with an iron grating, which I called the grocery shop. Our daily wants were supplied from this.

Our supplies consisted of in part, that is, for one trip, 10,000 pounds fresh beef, 500 pounds mutton, 600 pounds poultry, 2,000 eggs, 500 pounds fresh butter, fresh vegetables and fruits in variety, all kinds of canned goods, evaporated cream. Twenty-five to fifty loaves of bread were baked each day. Sixty gallons of ice cream (this kept in perfect condition, and the last was distributed to the patients the day before our arrival home). Our ice machine made three tons a day. Temperature of freezing-room about 28; cold

storage, 34. Liquors of all kinds, mineral waters, ginger ale, pipes, tobacco and cigarettes. The supply of fresh beef was reduced somewhat on the second and third trips.

HOW I DID IT.

System of Receiving Patients. — At Santiago we had three tents on shore (thanks to Maj. L. C. Carr, Volunteer Surgeon from Ohio, who was of the greatest assistance to us in providing the tents, and locating them for us). The patients came to us in ambulances from the hospital near San Juan Hill. (Some of these ambulances were upset or broke down on the way. The road was almost impassable, and as there were two tiers of stretchers in each ambulance, the patients were terribly shaken up.) They were brought into my tent first; here Drs. Manahan or Bottomley questioned them or their officers in regard to their previous condition. If a patient was very ill he was given an odd number, which signified a lower berth on the ship, that he might be more easily attended, otherwise he was given an even number, which called for an upper berth. These numbers were small nickel tags on a cord, which was passed over the patient's head and hung about his neck. This number corresponded to his berth number on the ship.

It was not customary in speaking of a patient to mention his name, he was known by his number. His temperature was taken by Miss Galt, his valuables taken and put in an envelope marked with his number. He was then given a canvas bag, the number of which corresponded to the number already given him. This bag contained a complete outfit, consisting of a brown duck suit, underclothes, slippers and soft hat. He was then taken with his bag into either one of the other tents, where he was stripped, given a sponge bath of corrosive sublimate by a bayman (there were two in each tent), his new outfit put on, his uniform put back into his bag (which was sterilized later on the ship), and he was sent aboard the ship in the launch.

It took us eight minutes on the average from the time a patient entered my tent until he was off for the ship. This system of receiving the patients, so simple yet so perfect, the rapidity with which it was accomplished, astonished the army officers who witnessed it, and they complimented us highly.

When the ship reached Boston the patients were returned their valuables and canvas bags, which they took with them when they left.

At Arecibo this work was done on the ship, as the patients were received late in the day, and it was thought best to get them on board as soon as possible.

At Ponce we took on nine patients only, and our work was carried on in one of the rooms of the Custom House.

And now, Mr. President, just a word or two about our surgeon-superintendent. He has said so many kind things of those under him that I cannot let this opportunity go by without expressing my opinion of our "General," as we called him. While giving due credit to all others connected with the ship for their noble work, I must say that it was to the wonderful executive ability of Dr. Herbert L. Burrell that the record made by the *Bay State* will serve as a standard for all relief expeditions of this kind. He went forth with the well-defined purpose of doing all the good possible as speedily and as directly as it could be accomplished. Zeal was supplemented with brains.

THE NURSING CARE ON A HOSPITAL SHIP.

BY MISS C. W. CAYFORD, BOSTON.

The problem of the amount and character of the nursing force on a hospital ship was unique. The factors entering into this problem for consideration were: the uncertainty of the length of time the patients would be on board ship; the question as to the character of the illness, whether surgical or medical, and the entirely unknown effect of sea-sickness. It was finally determined by the committee in charge of the selection of nurses, for a maximum capacity of 114 patients to have six nurses (women) and six baymen (male nurses). Before leaving Santiago harbor, and before the element of sea-sickness had made itself felt, it was evident that the working force was far too small, owing to the fact that through some misunderstanding no provision was made for the scullery work of the wards, and this had to be done by the nurses. Naturally this diminished the strength of the nursing force. Later this work was done by mess attendants, who were engaged for service alone in the wards. So that on our last voyage, with 135 patients, the day force consisted of two nurses, two baymen and two mess attendants for each ward. The entire night work of both wards was done by one nurse and two baymen. This seems a small proportion of night nurses for medical work, but it was found to be sufficient, as on all three trips the wards were noticeably quiet at night, the patients sleeping remarkably well. The difficulty, or, more accurately speaking, the impossibility of properly caring for bed-patients in an upper berth was met by assigning these berths to convalescent patients. Even in the lower berths the bathing of patients and changing of linen was considered with misgiving by those of us trained to consider certain details of bed-making and in the handling of bed-patients as essential to good nursing. This was due to the limited space between the tiers of berths and the necessity of working, in most cases, entirely on one side, and the box-like effect given to the bed by the rolling rod when corded to the bed frames.

However, it became evident early on the first voyage that what was needed was the essential life-saving care of the patients. To the men taken from the field hospital of Santiago it mattered little that the under sheet was at times somewhat wrinkled. What they needed most were baths, good food, good water, and plenty of them. These we were able to give them. In fact, it is a question whether in some instances they did not have more than a sufficient quantity of food, owing to the necessity in the convalescent cases of depending largely upon the patient for a report as to his condition, — and naturally after a long period of limited rations he was not eager to furnish information that would be likely to cut down his food supply, — and occasionally, I fear, to the pleasure of seeing those hungry men eat at times overruling the better judgment of the nurse. The bathing could be carried out without discomfort to the patient, but was more or less of a strain on the back of the nurse, and was an especially trying thing to do when the nurse was sea-sick.

The ward clothing of the patients when not worn proved a great source of annoyance; when not on the bed — which was most of the time — they were on the floor, making the wards very disorderly and caus-

ing much loss of time and patience on the part of the nurses. Later this was very satisfactorily overcome by having clothes bags hung at the foot of the bed. The idea of the bag was suggested by the individual toilet cases, containing brush, comb, tooth-brush and wash-cloth, attached to each berth, which were so much appreciated by both patients and nurses.

Considering the size of the galley, the service of the food was remarkably satisfactory. It would, however, have been a decided advantage could some place have been provided where the nurses might have prepared toast, gruels, eggs, etc., especially for the feeding in the typhoid-fever cases.

Very little laundry work was done while the patients were on board, owing to the limited supply of fresh water, and to the fact that the laundry opened directly into the after ward. Naturally the steam and heat were very objectionable. Fortunately the supply of ward linen was more than sufficient for an entire trip; otherwise we should have been put to serious inconvenience.

I would like to say a word in regard to the nurses' uniforms. Pongee silk may have its uses, but a working uniform on shipboard is not one of them. If sea-sickness is due in part to a mental condition, no wonder so many of us were so ill on the first trip. A more forlorn, ridiculous, grotesque — and to ourselves melancholy — uniform could not have been devised.

The most practical thing for a nurse's uniform on board a hospital ship is a short skirt of fairly heavy material (like duck or denim), shirt waist with celluloid collar, and gingham aprons. The whole should be of some neutral color — blue, brown or green, as very light or white clothing is unpractical on ship-board.

In the matter of ventilation the ship had a decided advantage over most hospitals. With the exception of watching the ports in case of storm or heavy sea, no thought or time was required in its regulation. The air was always fairly pure, except when the weather obliged the wind-sails to be discontinued and the hatches to be covered, and the heat in the wards was always at a minimum.

Throughout the entire trip the almost childish delight of the men in the enjoyment of the comforts and luxuries of the ship was quite touching. The expense of having a ship's library was amply justified on this trip. The books were eagerly sought, even by men too ill to read. It was really affecting the way in which patients would tuck away the books for fear they would be taken away. They seemed to cling to them as a connecting link to civilization. The extraordinary part of this mental process was that often the most illiterate were most desirous of having a book.

I think some of the conclusions to be fairly drawn from our experience in the nursing department of the ship are:

(1) That seriously ill patients cannot be nursed as efficiently as on land.

(2) That the mental influence of a voyage home, the ease of providing the absolute necessities, make a hospital ship of great value.

(3) That, contrary to expectation, sea-sickness did not apparently interfere with the improvement of patients even when fairly ill.

WORK OF THE MASSACHUSETTS VOLUNTEER AID ASSOCIATION IN SANTIAGO.

BY E. G. BRACKETT, M.D., BOSTON.

In the latter part of July it was decided by the Volunteer Aid Association to send a representative to the island of Cuba who should have direct charge of the distribution of the supplies sent by them, and who could determine from personal observation the needs of the Massachusetts men. Supplies had been sent by different transports, but not being in charge of any one, and there being no one to assume the responsibility for the Association, it was a question whether such supplies would reach their intended destination.

On the 24th of July I was asked to take this position, and start on the 25th with supplies intended for the men in Santiago. These supplies consisted of clothing, hospital supplies, prepared food, and delicacies for the sick, besides special contributions by friends and local societies. The lack of information of the conditions in Cuba at this time made the possibilities of the errand uncertain, except that the report of the sufferings from hardships and from disease allowed no doubt of its necessity. My directions from the headquarters of the Association were, therefore, somewhat indefinite, and I was asked to use my judgment in the distribution of supplies taken by me, and those which had already been sent by the *Harvard* and *Yale*, and after arrival to represent the Association in Santiago. The work was intended primarily for the Massachusetts troops, but it was desired that aid should be extended to other volunteers, and to the regulars when such was possible. The method of work, therefore, was entirely undecided, and for credentials I carried letters from the headquarters of the Massachusetts Volunteer Aid Association, and from Governor Wolcott.

It was necessary on account of the blockade and the quarantine of the Santiago Province to go by the way of Jamaica. Accordingly, arrangements were made by the Boston Fruit Company to ship the supplies on the steamer *Albert Dumois* to Jamaica, and to proceed from thence by sailing vessel across to Santiago. By courtesy of the Fruit Company, I was enabled to precede the goods and take passage on the steamer *Brookline*, arriving two days ahead of the *Dumois*. Then the goods were transferred to a thirty-ton sailing vessel called the *Little Wanderer*, the spare space in the hold being filled with barrels of limes which were obtained in Port Ontario, and after a three days' trip we reached Santiago.

At the time of arrival the city was in much the same condition as after the surrender, except the work of cleaning the streets had begun, and the American troops were beginning to be sent back to the States. The city was under military law, and was filled with the American and Spanish soldiers, and with the natives, who had not left the province during the siege. The city was still in a condition of extreme filth, it was the beginning of the rainy season, and the midsummer heat was intense. There was plenty of the army rations for the well, but a great scarcity of proper food and medicine for the sick and convalescent, and the sickness among our troops, as well as among the natives and the Spanish prisoners, had begun to be alarming. This sickness was principally a pernicious form of malaria, and there was some typhoid,

and yellow fever. It was at once apparent that the special needs which could not be met in the city were suitable food for the sick and convalescent, and hospital supplies, and the Association was at once cabled to that effect. It is to the credit of the officials at headquarters that within two days from the receipt of this cablegram a shipment of such supplies was sent.

The work of the representative of the Association was evident, but the method of carrying this out was met with the greatest difficulty. The Cubans were not disposed to render aid in any way, and could only be persuaded to work by the payment of exorbitant prices, while the lack of interpreters where Spanish alone was spoken made confusion of otherwise simple work. The roads were in such a condition that the transportation by means of the only method possible, the small drays, was extremely slow. I at once reported to General Wood, and he extended every courtesy to me during the whole of my stay on the island. Every American had already more than he could do, and therefore one could not look to them for material aid, but every possible assistance to aid in the work was always given to the Association's representative. After a day's search a suitable warehouse was found on Enramados Street near the water front, and to this the goods were transferred by means of the small drays from the wharf. It was necessary in carrying on this work to constantly guard all of the supplies, otherwise they would be stolen by the native Cubans.

The work for the Association on the island was evident, for there was no question as to the needs of the men among the troops, and this consisted mainly of food for men in the camp, and hospital clothing and supplies for those in the hospitals. The hospitals especially needed prepared food, soups, stimulants and hospital clothing, and fortunately there was a generous supply of pajamas, hospital bedding, etc., which was always found to be of great use.

There were two ways which could be used in the disposition of the supplies, both to the men in the camp and in the hospitals: One was the personal distribution of the goods, which, under the circumstances, would have involved more time than would have been possible to give, particularly since no help could be obtained in means of transportation, and it also would have involved the possible friction with the prerogatives of the officials. The other method was to determine the special needs from the surgeons, the commissaries, and such of the officials who had charge of supplying the companies, and through them to see that the goods reached their proper destination. There were always some such men available, through whom such distribution of the goods could be made, and without interference with the regulations and routine, and this proved to be the most satisfactory. The distribution was made according to the comparative relative need, and was sent either by the regimental teams or by small drays, which could be hired in the city. This latter always proved to be a slow method, as the loads carried were very small, and usually it was necessary for some one to accompany these supplies to be sure of their safe arrival. At this time nothing in the line of additional food could be obtained in the city; therefore it was necessary to rely on the supplies which had been brought, and to make the best disposition possible of them.

At the time of arrival there were two Massachusetts regiments which were camped on the island, the 2d and the 9th. The 2d were stationed about two miles north of the city, and it was expected that they would be sent home within a short time. The 9th were camped on the hill at San Juan, and it was generally understood that their stay on the island was probably to be an extended one, which proved to be true. Since the 2d Massachusetts was expected to leave so soon, it had little need of the supplies of clothing, but required food for the sick, both for use in the camp, and on the transport on the way home. At this time some of the supplies, which had been previously sent by the transports *Harvard* and *Yale*, arrived in Santiago, and were taken in charge by the Association.

No word was received of their arrival, but one lot was found on the wharf, where it had been unloaded from one of the lighters, and the second lot was found on board one of the large tugboats, to which it had been unloaded from the transport. Many of the boxes had been opened, but in general the shipments arrived in good order. Much of these supplies, as well as selections from the stores in the warehouse, were sent to the camp of this regiment, the selections being made with the probable short stay of the regiment on the island in view. Fortunately the orders to leave came within a few days, and these supplies were used on board the transport on the way home.

The 9th were in camp three miles from the city, on the San Juan Hill, and had the same general needs as the 2d, but transportation to this regiment was much more difficult, owing to the distance and the condition of the roads. Later in August, from the longer exposure to the hardships of the climate, they being the last to leave the island, their condition became such that the need of additional food for the men on duty and for special food for those sick in quarters was still more urgent. The majority of the regiment were using only the hardtack and coffee of the regular rations, and the whole regiment began to show the result of their continued stay on the island. Just before the regiment left for Montauk a shipment of supplies sent by the Association by Mr. Austin arrived, and in time for the use on the way home on the transport. This lot of supplies contained a large quantity of prepared food, condensed milk, etc., and proved to be most useful. At the same time soups and condensed milk could be bought at the commissary department, and a sufficient quantity was obtained to last until reaching Montauk.

During August there was but one hospital, the Nautical Club, in the city under cover, and to this the sickest of the men were sent. It was found that there existed a scarcity at this hospital of hospital clothing, food and stimulants, and of any kind of delicacies for the convalescent. During the month of August frequent donations of these articles, as well as the alkaline waters, which fortunately could be bought in the city, were sent.

About the time when the last detachment of the 9th Regiment had left the island the representative of the Association was asked by General Wood to equip and take charge of a hospital in the city of Santiago. For this there was taken a building formerly built for and used as a hospital by the Cubans, called the "Centro Benefico," but which had been closed for some months. There was some of the hospital

furniture which could be used, but in general it was necessary to select, for supplies could be obtained from different sources throughout the city. Medicines at this time were hard to obtain, but finally were found by collecting from the various sources about the city, and special foods for the patients were collected from the various supplies, which later had begun to come into the city. At this time there was left among the stores a quantity of supplies which could be used as hospital furnishings, and much of this, especially clothing, was used to fill this need of the hospital.

CAMP WIKOFF, MONTAUK, L. I.

BY W. H. PRESCOTT, M.D., BOSTON.

I WENT to Montauk, August 15th, as agent of the Massachusetts Volunteer Aid Association, and "to establish a diet kitchen to provide delicacies for the Massachusetts regiments which were coming." I arrived at Camp Wikoff about a week after the first patient was admitted to the hospital, and stayed until there were only twenty patients left.

When I arrived I found a great deal of confusion — there were few physicians, fewer nurses, and fewer still hospital-corps men, and new tents or wards were being erected.

Among the other causes of confusion were: (1) the limited number of cots; (2) the difficulty in obtaining supplies (of all sorts); (3) the lack of an index of the patients; (4) the constant changes taking place among the patients; (5) the presence, in the wards, of "outsiders"; (6) the lack of any policing, and, finally, the absence of a firm, controlling hand always within reach. The surgeon in charge, Col. W. H. Forwood, to whom I applied for permission to erect a diet kitchen (without expense or trouble to the Government), did not consider one necessary, and it was nearly two weeks later when permission was given to Mrs. Valentine Mott, representing the Red Cross Society. Immediately after permission was obtained Mrs. Mary Hatch Willard, an expert dietitian sent by the Red Cross Auxiliary No. 3, and I, working in hearty co-operation, planned, erected and equipped a large diet kitchen with a floor space of over 2,000 square feet, and capable of providing the delicacies needed for 1,500 men. It was intended to show that food could be neatly and satisfactorily prepared in a kitchen in a field hospital, and it fulfilled its mission. In addition to the diet kitchen erected at the General Hospital there were similar kitchens (although smaller) provided for the three division hospitals, and additional equipments furnished to the one established at the Detention Hospital by Dr. L. A. C. Hughes and Miss Fennessey.

Almost the entire expense of the erection and equipment of these kitchens was borne by the Massachusetts Volunteer Aid Association, as well as the running expenses, until they were turned over to the Government, which had also borne part of the expense of their establishment. And it seems to me that it was only necessary for the outside "helping" societies to take the initiative, get a thing started, and then turn it over to the Government. In my experience, those in authority were always glad of help, and willingly accepted the' things turned over to them where their value had been established.

The camp was an ideal one, situated as it was at the eastern end of Long Island — not too far north nor too far south for the purposes for which it was started. It was intended for a quarantine camp for those soldiers coming from Cuba. If it had been farther north the cold would have affected the men much more seriously than did the air of Montauk; if it had been too far south the danger from the spread of yellow fever, if it once got started in the camp, would have been great. There must be sufficient room for 25,000 men. The water-supply must be good and abundant. This was provided by the two large ponds, into which the horses and mules could be driven, and a well forty feet deep provided water for the men. The water in the ponds was brackish but not harmful, that in the well laxative but otherwise all right. A large force pump was put into the well, which forced the water through two large sand filters and then to the different parts of the camp.

The water in the well, in my opinion, never became contaminated — surely not before the sand filters removed any danger from its use, even if it had become contaminated. I used the water all the time I was there and never suffered any inconvenience from it. The water pipe leading to the hospital broke a few days after my arrival, and the only water for drinking purposes during the following three days was the Hygeia and Apollinaris, which the Red Cross and Massachusetts Volunteer Aid Association furnished.

The physicians varied as to ability and character, as they do in every part of the country: some were good, some were poor, but the average was above that which you would find in any large city. One doctor ordered four quarts of whiskey for his ward, and the patients received one quart, while he kept the rest; he was removed the next day. Another suffered much from rheumatism, for which he took large doses of whiskey, and on that account was unable to do his work, so he was relieved. Another cut off the uvula of a patient suffering with diphtheria, that he might breathe more easily, and he was discharged. Another was frightened by finding a case, as he thought, of yellow fever and ran away. To raise the average we had three of the prominent men of the country: Drs. Nancrede, of Ann Arbor, Senn, of Chicago, and Delafield, of New York.

The nursing was, on the whole, good. The majority of the female nurses, both the trained nurses and the Sisters of Charity, did their work conscientiously — perhaps the only criticism I would make of them was that they could not appreciate that the doctor was supreme in his ward. I cannot say as much for the male nurses, who came from the different parts of the country, and who found fault with everything instead of trying to make things better. Many of them stayed twenty-four hours or less, and it was a relief to the authorities to have them go. The hospital-corps men were for the most part untrained, and while they did as well as could be expected of them under the circumstances, it has seemed to me that there was a great mistake made in the manner of their enrollment, and that not enough inducements were offered to procure men qualified for such work.

There were five hospitals in all — the General, which at one time had a capacity of 1,800 beds, the Detention, with about 400 beds, and three division hospitals, which had altogether about 450 beds. The De-

tention Hospital was in Detention Camp, and was the hospital to which all suspicious cases were sent. When I arrived, this hospital was under the care of a captain in the regular army, — a bright capable man, — but utterly unfit for his position, because he was under the influence of liquor a part of every day. He was removed and Major Ebert, who had won a name for bravery and ability at Santiago, was appointed, and again proved himself to be a man of exceptional ability. The General Hospital was under the direction of Major C. L. Heizman, who had as assistants Major I. C. Brown, Major L. B. Almy, and Major H. D. Thomason. All of these were men of ability and did their work carefully and thoroughly, but were handicapped by the lack of authority. The plan of the hospital was an excellent one, but there was a lack of executive ability in the man who had charge of its construction and general charge of all the hospitals. It has seemed to me that this was one of the "outs" of the camp, for there was needed great executive ability and the power to delegate authority to "the heads of departments." The surgeon in charge had to sign every order, and, as he was not (and of necessity could not be) always on hand, the work dragged and much confusion resulted. Another source of trouble was the absence of written orders and the liability of having orders countermanded almost as soon as they were issued. Another "out" was due to the fact that the Government did not use the water-way for the transportation of food and supplies.

The Long Island Railroad is a one-track road, and it could not take care of all the supplies and people which it was necessary to bring to Montauk. The management of the road is to be congratulated upon the splendid work done and the great ability shown, but in spite of all that could be done there were many vexatious delays and much hardship as the result. The Volunteer Aid Association, through the generosity of one of its members, was able to provide the tug *Alert*, which made bi-daily trips between New London and Montauk, thus making it possible for me to get the supplies sent at regular times (and on time), and also made it possible for me to procure things quickly when, for any reason, they were needed.

The means provided for the furloughing of the men were inadequate, especially at first, and there was suffering in consequence. But many distressing cases of men taken ill at the station and on the train were due to other causes. The men had come from Cuba, and their cerebration was slow and poor, and they could not be relied upon (I am speaking of those in the hospitals) to do what they were told. The physicians were slow to realize that this was so, and when a man had no rapidity of pulse, no elevation of temperature, and said he felt well, he was recommended for furlough. It takes some time for a furlough to be made out, especially if there are fifty to seventy of them and only a few clerks to do the work. The furlough was made out at the hospital, and then the men walked to the station, a distance of a mile and a half, through the dust and in the sun. When they arrived at the station their transportation and commutation of rations had to be made out at the Quartermaster's Department, which meant a farther walk of 300 yards (150 each way) through sand up to one's ankles. Of course it took a good deal of time to do these things and by the time the train was ready to leave the men were tired out and some of them quite ill (their illness perhaps aggravated by a visit to the lunch counter and its pies). I saw many patients having severe chills in the barn-like waiting-room of the station, but it was seldom indeed that a man, no matter how ill he was, could be induced to return to the hospital. They were furloughed, and all you could do was to reason with them, and they could not understand any argument. They wanted to get home, and were near the train which was going towards their home, and nothing you could say would make them go back; not that they had been badly treated, but it was going away from home and they were going home. The quartermaster's office was finally moved to a tent near the station, and the Red Cross opened a tent right across the way where the sick men could be taken care of before the train was ready to start.

Then the long railroad journey was trying at best and especially so when made in an ordinary car without comforts. Mr. Ernest McMillan, of New York, with the aid and co-operation of Mrs. Willard, provided a hospital car which he ran at his own expense until it was turned over to the Government. The car (an ordinary baggage one) was lined throughout with white oil-cloth, and cots and reclining chairs put in. A nurse and doctor went with the car on each trip, and all the medicines and nourishment needed were taken along. Mrs. Whitelaw Reid soon after sent two Wagner cars to be used in the same way, but even under these circumstances a dusty ride of four or seven hours is a strain upon a sick man. After the second or third week a "board of investigation" was appointed, which went around every morning and decided what patients were able to be sent away, and after that I do not know of any one who suffered material injury because of his being moved. When for any reason a very sick man had to be moved, the cot upon which he was lying was taken and put into an ambulance, driven to the station, and then put into the "hospital car" and sent along on the train, so there was no moving of the patient between the hospital at Montauk and the one to which he was sent. The nurses in the "hospital cars" kept a record of the temperatures, etc., of all the patients carried, which will be published at some future time.

A great deal of my time was spent in the distribution of the supplies sent by the Massachusetts Volunteer Aid Association to the 2d and 9th Massachusetts regiments, and to every regiment of regulars. In this work I was aided by Grafton Cushing, Esq., who rendered invaluable assistance, and who soon became known to every regiment as the distributer of Massachusetts benevolence.

There was distress at Camp Wikoff, some of which was relieved and more prevented by the various societies which had representatives there. A great deal of the distress was due to the lack of preparation and to the nature of case, but in spite of it all, in my opinion, the hospitals at Montauk became model field hospitals.

Complaint has been made that taps were not sounded, salutes fired, nor sufficient attention paid to the dead. As the cemetery was within one hundred yards of the hospital, the cruelty and danger of taps and salutes can be readily appreciated. On one day there were seventeen deaths, and if these ceremonies (proper and impressive though they be) had been performed I be-

lieve that fifty more men would have died among the 1,600 patients, then in the hospital, as a result.

In conclusion I wish to pay my tribute of praise to the regular soldier. I found him to be brave, uncomplaining, obedient to orders, above the average in intelligence. No matter where he may be put, the American soldier will be a credit to the nation and bring honor to himself.

GENERAL REPORT.

BY JAMES BOOTH-CLARKSON, M.D., BOSTON,
Medical Agent of the Massachusetts Volunteer Aid Association for Porto Rico.

THE Massachusetts hospital ship *Bay State* arrived at Ponce, Porto Rico, on Sunday, September 11th, but before anchoring was met by the port authorities with orders to go at once to Guanica for refuge from a hurricane signalled from Barbadoes. The ship had to go into the landlocked harbor of Guanica after dark and without a pilot, there being no other alternative, as, being near the land, and with only two days' coal on board, she could not have riddeu out a hurricane at sea.

Next morning, September 12th, we went ashore to visit the camp of the First United States Engineers. This was one of the best if not the best camp seen in the island, as it had been iutelligently selected, laid out, drained, and the discipline was similar to that of the regular army. Discipline had evidently been a successful hygienic measure, as the health of the men was much better than that of the regiment preceding them, who had found the same site a swamp and had camped in it without seemingly improving it. At the request of Dr. Williams, the *Bay State's* medical staff visited the hospital, which was in very good order considering the circumstances. Dr. Williams had made arrangements for getting eggs, milk, chickens, etc., from the surrounding country, so there was comparative comfort, at the same time he was very glad of some medical and other supplies from the *Bay State.*

There were about 35 cases in hospital (which, after all, was a large number for a company post), most of which were stated to be analagous to the mountain fever of Florida and the Southern States, with perhaps more pronounced intestinal symptoms.

The cases were most satisfactorily treated with intestinal antiseptics, as spirits turpentine, listerine, salol, stimulants, turpentine stupes to redness, and quinine as a tonic. He (Dr. Williams) had not discovered, neither did the microscope, any cases of malaria. There seemed to be more care to prevent disease in this regiment than in others met with; for instance, the camp was well chosen as to site, was well drained; the mules were three-quarters of a mile inland from the camp, aud the sinks a considerable distance from it towards the sea; all trees except a few large ones were cut dowu; there was a U-shaped trench around the whole camp, besides trenches round tents, which had wooden floors; the men were warned what to avoid, such as mangoes, pineapples, bananas; and orders had to be obeyed, as there was none of the "If I were you I would" about orders there. Water was carefully filtered. The men took two grains of quinine thrice daily, and were encouraged to take oranges, limes, sweet limes and lemons. They found the regiment they relieved living in a swamp on the beach, and nearly all sick. They evidently thought a good deal of their medical officer (aud justly so), and were desirous of following his advice.

From Guanica the *Bay State* went to Ponce again, where we were informed that there was a great deal of sickness, a shortage of supplies, and a great deficiency in regard both to surgeons and nurses, while most of the latter available were totally untrained. It was also said that the 6th Massachusetts Regiment (our especial care) was at Utuado, to which place the roads from either Ponce or Arecibo were quite impassible, as mules and ambulances had fallen down precipices in trying to get there.

The general hospital was visited, and this, like all others seen, was most suitably built for the climate, namely, wards round a court-yard with a fountain and trees in the centre, and offices on each side of the entrance gate. There was no glass in the windows, but outside shutters. The wards were large and lofty, but were much crowded with our sick, being, like Boston street cars, indefinitely expansible, as "Necessity knows no law." Everything was short, and this was not well or easily distributed. While doing what was possible for both Massachusetts and other troops, both pecuniarily aud otherwise, I was impressed with the fact that the so-called "contract surgeons" (who should have been called "acting assistaut surgeons") of the United States Army were really worse off than either patients or nurses, and did what was possible to help them. Since then I have heard complaints about these gentlemen in the States, but I heard none in Porto Rico. It would not have been suprising if there had been, for if a so-called "contract surgeon" is treated worse than a mule, it is difficult to see how he can be very enthusiastic, when at his engagement he is told that he ranks as, and has the privileges of, a First Lieutenant in the United States Army, and then is threatened with court martial if he wants to buy a can of salmon from the commissariat stores. Seven out of twenty of these gentlemen were Massachusetts men, so I felt it quite justifiable to do all that was possible for them.

General Henry told me that a great deal of sickness among the volunteers was due to their not taking care of themselves, which I saw afterwards was probably true. Another camp of the First United States Volunteer Engineers was visited here, and was found to be in the same excellent conditiou as the one at Guanica. Certain camp rules had been established in regard to admitting pedlers, and the prices at which they had to sell fixed, which did not seem to be the case with any other troops met with in the island. The commauding officer said he was very short of officers in common with many other regiments, as officers had been appointed in the United States Army simply with the iutention of being put ou staff duty there, aud never joining at all. While here there occurred two cases of supposed yellow fever, one of which seemed probably so, the secoud (which had just arrived from Panama) being a case of ptomaine poisoning.

Here it was realized how difficult it was to get auy reliable information about anything — no one told the same tale; as an example of how far newspaper reports could be accepted, it may be mentioned that an ice-plant which was reported in the United States to be in working order, and invaluable to the sick, had not even been put up at all. Examples of the want

of discipline occurred daily: many men who could hardly be considered sick came off to the ship and demanded a passage, without seeming to think it needful to get any permission from either medical or other officers; others wanted money, on the ground that they were going to be left at the landing point in the United States but not going to be sent home. It was claimed that many officers who even had arrived were political appointments quite irrespective of their knowledge of their work. There appeared to be very little drill, while the soldiers seemed allowed out from quarters at any time, irrespective of leave. Most of the men who were well were employed in driving apparently empty ambulance and army wagons between Ponce and Port of Ponce, a distance of about three miles, in spite of which activity every one said "that it was most difficult to get anything done," and that while "there was a shortage of stores it was very difficult to get even those there were distributed." The ration of bacon and hard-tack, with (when they were lucky) beans and canned tomatoes, was quite unsuitable for the tropics, and every one, whether sick or well, seemed anxious to get back home.

The *Bay State* arrived at Arecibo on Monday, September 19th, and was at once boarded by Dr. Manahan, who, with Dr. Crockett, had made a very stiff ride from Ponce to Utuado by an almost impassible road, with the view of taking immediate supplies to the 6th Massachusetts Regiment. Dr. Manahan was able to inform Dr. Burrell as to the real condition of things there, and as to the possibilities of moving the sick out, it having been decided before this that the sick of that regiment could not possibly be moved out via Ponce, while it was more than questionable if they could reach the ship by the way of Arecibo, which town was about twenty miles distant over a very bad mountainous road and still in the hands of the Spanish.

Dr. Burrell now decided to go himself to Utuado, so he and I started, but, it being late in the afternoon, most of the journey had to be done after dark, so Utuado was not reached till about 11.30 P.M., after some experiences, for a detailed account of which see "Burrell's Ride," as given at the Tavern Club dinner. Here it is only necessary to say, that, by the time we arrived, much respect was felt for the native horse, road, river, and man, and the latter had a story to tell about "two mad Americans," as he considered us.

Next morning we started back for Arecibo, following the sick train, which had been marched off earlier by Dr. Crockett. What was seen during our short stay was by no means inspiring, though, as far as the sick went, everything seemed to have been done that could have been under the circumstances.

That evening ninety sick were embarked, including Major Dow, the senior surgeon of the regiment. This made an already shorthanded medical staff still more so, and it was decided that I could be more useful in making headquarters (while in the island) with the 6th Massachusetts at Utuado than elsewhere. Having seen the condition of affairs at Utuado, and received statements regarding them from persons there, Dr. Burrell decided that he could leave two nurses, the Misses Parsons and Galt, and two baymen, Messrs. Kemp and Lyford, with me to assist in the care of the sick there. At the same time, they were to be still considered as part of the staff of the *Bay State*, and be treated accordingly.

Up to this time all my observations tended to show that no attention to either the comfort or health of either surgeons or nurses was in any way shown by the authorities, which had resulted in much sickness, want of efficiency, and discontent, so I was very particular in requesting full authority in regard to what may be termed the interior economy of my small contingent, as it was of the first importance that they should return to the ship in as good health as when they landed in Porto Rico — which they were! In order to be prepared for all possibilities, I suggested to Dr. Burrell that, should it be impossible for the nurses to avoid those (to my mind entirely unnecessary) discomforts, privations, and general inconveniences, which would certainly place them on the sick-list, it should be considered quite in order for me to take them to San Juan or Arecibo, and place them in the best hotel (this is not saying much) to be found there till the *Bay State* returned.

Finally, the afternoon of September 21st saw the *Bay State* sailing out, and us sailing in through the surf to what was called the "Embarkation Place," from which the party had to be transferred to three small boats, and sail a couple of miles to the town of Arecibo through a kind of shallow lagoon (made by the Rio Grande), making a curve round a sand-bar before reaching the sea. It was interesting to note that the women seemed to anticipate the prospect with more satisfaction than the men. Possibly the former were considering the picturesqueness of the situation, while the latter were thinking that the general comforts of Porto Rico would be much inferior to the *Bay State* — and in this they were right. Knowing that Arecibo would probably be a sort of base of operations, I called on the Spanish commander early next morning to get a permit attached to my appointment (originally received from Mr. Sherman Hoar) permitting me to pass the Spanish lines at any time, following my system of getting the endorsement of any senior American or Spanish officer in whose district I might be. On several occasions this document was found very useful.

The first part of the trip to Utuado was pretty easily managed, though it was all the ambulance with the nurses and baymen could do to get through the fords without wetting the passengers and the baggage. Next day these fords were impassible, and practically continued so for the rest of our stay in the island, leading to great convenience and considerable risk. While the party was lunching not far from the American outpost rain commenced, which thereafter continued rather more than less permanently. During this halt I was very seriously exercised in my mind as to what to do with my party, for no arrange ments, except theoretical ones, had been made; there was no known accommodation, no hotels, and the knowledge of the language of Spain possessed by the Americans in Utuado and ourselves collectively did not amount to much. First impressions being very important, arrangements had, if possible, to be made, so that the sudden change from the comforts and admirable arrangements of the *Bay State* to the unadmirable arrangements of everything Porto Rican and Porto-Rican American should not cause too severe a shock, and I had a very depressing feeling that out of the whole party I alone knew practically what that meant. So pushing my razor-backed cavalry ex-cart horse to full speed I arrived, drenched, some three

hours ahead of the main body, and, meeting an acquaintance to whom I explained circumstances, was met with the consoling reply, "Get out of those wet clothes or you will have fever, and put off till to-morrow," which did not elucidate matters much. I had with me, fortunately, Sergeant Edwards, a most excellent soldier, who, not only now but on many other occasions, was of the greatest assistance to the whole regiment and myself, and with his aid I was able to see several houses which might be suitable for us, as it was decided that the *Bay State* party must not be separated, as it would then be impossible to follow out in detail the general instructions. A very attractive residence was procurable, and under the circumstances the temptation was great to secure it at once, as it fulfilled all the requirements in regard to comfort, space, neatness, cooking, strict cleanliness, sanitary arrangements and water, and in fact everything, except that it was in a basement, which trangressed the perhaps most important rule for the preservation of health in the tropics, namely, that the living apartments should be as high above the ground as possible. However, with some search, apartments almost as comfortable were obtained in the house of a Señor Perada, and by the time the drenched ambulance arrived arrangements had been made which gave us a very pleasant home during the stay in Utuado. This was a matter of considerable satisfaction, for, with the exception of the First United States Volunteer Engineers, so often alluded to, the naval ships seen at various times, and ourselves, no one had seemed to try to be comfortable in the island, and this must have had a bad effect on the general health.

Señor and Señora Perada treated their American family with great kindness while in their house, and took great pride in the two nurses, particularly when they knew that they were the first American ladies who had been at the front — in Porto Rico at least.

As the great point in regard to tropical diseases is prevention, instead of treatment, as there is often too little time for the latter, at the first dinner attention was drawn to the few simple rules, which, from that time, were strictly followed out:

(1) Four grains of quinine were to be taken every morning at breakfast time.

(2) All water and milk had to be boiled.

(3) Abdominal bands to be worn.

(4) Needless exposure to heat, damp or fatigue avoided.

(5) Care to be exercised in eating fruit, and the less the better after breakfast. This precaution was not quite so necessary in the western as in the eastern tropics, but the Porto Ricans seemed to be very careful on the point themselves.

(6) Particular care to avoid whatever might tend to cause what, for want of a better name, must be called "chill," as keeping on damp clothes or boots, sitting in draughts, particularly when overheated, or too great indulgence in cold baths; also to have blankets handy for the cool hours of a morning, as tropical nights are very deceptive, and it is particularly during the early morning hours that the increased action of the skin renders the body more liable to take "chill," which produces congestion of the internal organs, particularly of the intestines.

(7) It was not necessary in this instance to emphasize great moderation in diet, smoking, and in alcohol particularly.

(8) Breakfast was to be at 7.30. A.M., lunch at noon, and dinner at 7 P.M., when the serious work of the day was over. Ample time was to be taken for meals, and a rest in the middle of the day. No so-called exigencies were to be allowed to interfere with this, because there was not the least reason for it.

(9) The women particularly had to have one half-day off a week, and if possible the baymen too, which half-day was to be made a pleasant holiday. The weather, however, did interfere with this mostly.

(10) That while on duty in the hospitals the nurses and baymen were to obey all orders, except any which might infringe or lead to the infringement of any of the above rules, in which case the matter was to be referred to me first; also, no new arrangements were to be permitted from outside sources while I was absent on various duties from Utuado.

On several occasions this latter regulation (which, like all the others, was strictly carried out) saved our position from changing from a fairly pleasant one to a very unpleasant one, when the character of the work done would probably have been less satisfactory, and it is probable that the nurses and baymen would neither have returned to the *Bay State* as well as when they left it, nor have been willing to remain longer on the island if required.

On comparing notes with the various persons met with in the island, whether soldiers or sailors, whether individuals or in bodies, it was interesting to learn that those who seemed to be in anything like good health claimed to have lived very much as we did, while it is certain that the majority of the sick could most conscientiously deny having followed out any rules at all. Just before our arrival in Utuado things seemed to have been in pretty bad condition, but the arrival of stores from the *Bay State* mitigated this considerably. There was still, however, a deficiency in some drugs, as chloride of lime, strychnine, alcohol, paregoric, brandy, glycerine, and anything in the way of mouth washes, while eggs and milk were sometimes difficult to get. There were about 400 sick in hospital, in quarters and at sick-call, with, for some days after our arrival, only one clinical thermometer for the lot; most of the nurses were quite untrained; there were only two medical officers, who had to attend three hospitals, sick in quarters, sick-call, and also some separate company posts.

After some arranging and rearranging, I was given charge of No. 1 Hospital, Miss Parsons and Mr. Kemp being also attached to it, while Miss Galt and Mr. Lyford went to No. 2, and all did what they could for No. 3. Hospitals Nos. 1 and 2 had about 70 cases each, and No. 3 about 25. Most of these cases were typhoid at first, but later on there were more cases of malaria and continued fever. Some of the typhoid cases seemed to be of a very severe character, and a great many of the nurses were taken sick and some died. At first sight the hospitals seemed to be in a very satisfactory condition, only, perhaps, a good deal crowded, but closer acquaintance showed how serious a matter the deficiency was in trained nurses. Of four stewards only one had received any hospital training, and barely a third of the nurses were hospital-corps men or civilians who had volunteered for the front. The hospital-corps men said they had only

been instructed in first aid to the injured, and knew nothing about bed-making, bathing, or the ordinary care of a bed-patient. The remainder were men from the ranks. Some of these had volunteered to take care of special friends, and were willing to be taught, and when taught were faithful in their work; and of these many became sick and some died. Others, while doing the best they knew how, probably, but being quite untrained, would let typhoid patients stand on the floor while the sheets were changed, allow them to sit up in bed, use chambers instead of bed-pans, and get articles of food from outside or from other patients, as neither they nor the patients in any way appreciated the necessity for ordinary precautions, or for strict adherence to prescribed diet. Others, again, declared they would much prefer being in the guard-house to nursing in hospital, and some of them managed to get there. There was also a great want of trained cooks too, both for the diet kitchens and the regiment generally. This probably added much to the sick-list to begin with. Owing to a lack of kettles, boiling water could not be had to wash dishes, and until a laundry was established the bedding of typhoid patients had to be used longer without being washed than was advisable.

It will readily be seen how valuable the presence of the four trained nurses from the *Bay State* was under these conditions, and the moral effect of the presence of the ladies was very apparent. They themselves were frequently very discouraged and more than once said, almost in tears, that while they "knew the work they were doing was useful, still it seemed only to be a drop in the bucket compared with what ought to be done," but the general verdict was that they could not appreciate the amount of good their presence had done to both the patients and men generally. Meanwhile, in addition to the charge of No. 1 Hospital, I placed myself at the disposal of Dr. Washburne, to assist in whatever he considered conducive to the benefit of the regiment, such as establishing a wholesale water-boiling and milk-boiling plant and establishing another hospital, etc.

During the first week Utuado was quite shut off from the world; the road to Ponce was washed away, the fords to Arecibo were impassible, while the telegraph wire to each place was down, as it mostly was, so a cablegram sent to announce sailing of the *Bay State* did not reach Boston till after her arrival. About this time I had to go to San Juan to see if coal could be got for the *Bay State* on her return, and cabled in the affirmative. This was a very interesting trip, as, the fords being too high, the mountain pass had to be used. San Juan was still under Spanish rule, the commission was holding a daily session, and affairs generally were somewhat unsettled. On arriving at Arecibo again, there was a telegram from Dr. Washburne requesting me to arrange for receiving, putting up for the night, feeding, and embarking next day about sixty sick, to be called for by *Relief* October 5th, which was done; also incidentally to look at quarters which might be suitable for hospitals, headquarters, military offices, officers' mess, etc., which was also done. At intervals, also, there were numbers of letters to be replied to to America, about numerous relatives who were in or had been in the island.

While absent from Utuado some acting assistant surgeons had arrived, who were mostly distributed to the company posts hitherto without any, also some nurses, who in a week were very anxious to leave again, which was not surprising, in view of the instructions for their treatment telegraphed from headquarters, which was to the effect that "Women nurses were to be treated, rationed, and quartered as hospital-corps men, and no expense was to be incurred for them." On my return I was asked to take charge of N. 3 Hospital, and to make myself generally useful. In a few days a cablegram arrived announcing the sailing of the *Bay State*, and it was again necessary to go to Arecibo to meet her, which I did on Sunday, October 9th. Going by the mountain pass again, I could see the escort of the paymaster's money chests and a company of the 6th Massachusetts (which had started nearly a week before) detained between the fords, being quite unable to either go forward or return.

On arriving at Arecibo there was quite a lively little skirmish going on between the natives and the Spanish soldiers, in which five were killed and twenty-five wounded, which gave an opportunity of seeing a few bullet and machete wounds. The people were in a state of insurrection, and were being incited to mischief by leaders, who seemed to be denouncing the Spaniards and the acting American consul, Mr. Wilson, who had been a very good friend to every one, while the Spanish troops were drawn up under arms outside their own barracks ready to fire on the mob.

The only way to handle this position without much loss of life was to get some American troops in the town at once, to co-operate with the Spanish soldiers in keeping order, and as the Spanish commander very readily sanctioned this, a telegram was sent to Colonel Rice for permission to send a messenger to meet a company, then on the way by the mountain pass, and order it to come on to the American consulate. As the town was patrolled that night by both American and Spanish troops, the rioters had to console themselves by burning and looting the outlying estates, and at one time more than twenty burning plantation buildings could be seen from the American consulate. Every night, and often during the day, estates not guarded by troops were robbed and burned.

Next day Dr. Washburne telegraphed that he was sending down a number of sick the day after, which he wanted to place in the Spanish hospital, which I was "to get the best way I could." This proceeding did not hold out an altogether enjoyable prospect, for the Spanish still held possession of the town, and there were about twenty-five Spanish troops in the hospital, which, moreover, was not a military but a municipal one, and was controlled by Sisters, who were universally respected throughout the island, while in addition there were quite a number of the townspeople occupying it.

Public opinion was strongly opposed to this performance as being against vested interests, but fortunately the Spanish commander was amenable to the suggestion that even the American Army might not be able to protect his sick soldiers after the exhibition of the previous day, and that they had better go with the regiment next day at any risk rather than be left to the fury of the people. The *alcalde* had to accept the position that "Necessity knows no law," and that he had to deal with the Sisters, while he was generously offered the use of any available building in his own town (except his own hospital) as a hospital, and

finally the hospital was ready for the sick on arrival from Utuado.

Next day the Americans took over the town from the Spanish, and during a very interesting ceremony the anarchists of the district seized the opportunity to set fire to several residences belonging to so-called "Spanish sympathizers," which meant any one whose house was worth looting.

On October 12th the *Bay State* arrived, being rejoined by myself and the nurses the same evening, while the baymen came on board a few days later in San Juan, and all in as good health as when the ship left us, though had we remained in the island it is probable that work would have had to be carried on at less high pressure to have maintained as good a bill of health permanently.

Tropical diseases are still very obscure and very little has so far been done in temperate climates for the furtherance of their scientific study. This has been recently fully recognized in Great Britain, where a school for the study of tropical diseases has been founded, with the sanction and assistance of the Colonial Office, while a journal of tropical diseases is being published, edited by Surgeon-General Sir Joseph Fayrer, an Indian medical officer of great experience. Possession of both eastern and western tropical countries will give the United States great advantages for similar enterprise.

At present it is not easy to differentiate between malaria, typhoid, continued fever, the unclassified fevers, and, where it is liable to occur, yellow fever, while the treatment of these diseases, and also cholera, dysentery, plague, etc., seems to be empirical. When yellow fever can be excluded, owing to probabilities, and if in doubt, it seems safest to diagnose typhoid as being the most serious, which is shown by the experience of the American Army in the West Indies and Honolulu, the French in Algeria, Tonquin, and Madagascar, and the British in India and Egypt. In the latter army this disease still causes the largest mortality, which is about 43 per cent. of total deaths. The native army with other native races seems to be more immune, which immunity is apparently shared by the prisoners. Typhoid seems to spread more rapidly and be more virulent in tropical climates, and very careful investigations carried out in India seem to show that there must be some other sources of enteric contagion than those usually accepted.

As those taken sick in the tropics seldom seem to recover their former health without a trip "home," it is certain that preventive measures are the most important as regards armies (and in fact as regards every one), and it is encouraging to find that those armies in which this has been most carefully adhered to have suffered the least from disease. For example, the French Army, which, since the days of Napoleon the Great always has disregarded the advice of the medical staff, has always suffered more in its most healthy expedition than the British in its most unhealthy expedition. The British military authorities had learned enough before the last Ashantee Expedition for the commanding officer (H. R. H. the Duke of Connaught) to inform them on the parade at Aldershot "to do all the doctors told them," and had a certain royal prince followed out his brother-in-law's order he might have been alive now, but he thought, as a good many military officers did during our late war, and which fact I put before the investigating commission, that, in the former words of Lord Wolseley in the "Soldier's Pocket Book," "Medical advice is a very good thing — when it's asked for."

All that can be said is that persons, whether civil or military, who act on such a principle in the tropics will probably stay there.

As tropical diseases strike "butt end first," as sailors say of a white squall, and frequently leave no time for treatment, which at best is unsatisfactory, preventive measures should be particularly to the following:

(1) Selection of the soldier for service in the tropics who should be of good physique, not under twenty-two years of age, not anemic or of a strumous or arthritic diathesis.

(2) The rations, clothing, underclothing, and headgear should be suitable, and houses raised above ground should be used instead of tents.

(3) The water and milk supply should be most strictly supervised, as these are, so far, considered the main sources of malaria and other diseases.

(4) The fatigue work should be done by natives, and there should be no over-drill or instruction. Hence the commanding officers should not be a cross between a sergeant-major and a master-tailor, but should be in touch and in sympathy with their men.

(5) The simple rules for health in the tropics are those the *Bay State* party followed out at Utuado, which are before referred to.

(6) Regimental officers should be trained in the prevention of disease in an army in tropical climates.

(7) The life of the soldiers should be made as pleasant as possible to avoid home-sickness and *ennui*, which will certainly lead to other kinds of sickness.

(8) Commanding officers should be informed, and in no uncertain way, that medical advice in regard to the health of troops, especially in time of peace, is a "very good thing" even when "it is not asked for," and that they will be held very personally responsible for disregarding it even in the time of war.

Finally, it would seem that Charles Lever, the author of "Harry Lorrequer," has condensed almost the whole duty of man, so far as living healthily and comfortably (it might be too much to use the word happily) in tropical climates, in the answer he gave a patient as to how to escape cholera, which was then raging in Ireland, during which epidemic Lever was working hard at a West of Ireland dispensary. His prescription was:

> "Fear not, but be serenely gay;
> Prudence in living show;
> If you would have the men say 'Nay,'
> In *corpore* say 'No.'"

THE SHIPWRECK OF THE STEAMSHIP "LEWISTON."

BY T. B. SHEA, M.D., BOSTON.

The Massachusetts Volunteer Aid Association, desiring to bring home Massachusetts sick soldiers from Camp Wikoff, chartered the steamer *Lewiston*, which, after being duly inspected and provisioned, sailed Saturday, September 3d, for Montauk. The *personnel* of

this expedition, besides the captaiu and crew, consisted of Dr. Myles Standish with an ambulance corps, Dr. Douohue, Dr. Stubbs, Dr. McIntyre and myself representing the Aid Association.

We had a pleasant voyage to Montauk, arriving about four o'clock Sunday afternoon. Dr. Standish and I went ashore aud hastened to the camp of General Wheeler, who was at that time in charge of Camp Wikoff. We found the general in the "detentiou camp," and I presented my letter of introduction from Dr. Bradford. General Wheeler received us very cordially, and praised Massachusetts highly for its part in the war, commending especially the good work of the Voluuteer Aid Association. The general then gave me "passes" and a letter to Colonel Forwood, the medical director of the camp. Meeting Colonel Forwood at his headquarters, I explaiued our errand aud plans for carrying it out. We were anxious to receive the sick soldiers the next morning and leave Montauk early Monday afternoon. To this arraugement Colonel Forwood demurred, saying that the soldiers would have to be furloughed, quartermasters must issue more clothing, transportation would be difficult, as most of the cases would require ambulances — in short, that it was an impossibility to have the men ready by the time named. After a little persuasion, however, the colonel consented to make the attempt, and calling the surgeons of his staff together he ordered them to discharge those cases which could be moved. After visiting the hospitals and lookiug over the cases we were to take with us, Dr. Standish aud I left the camp about midnight. Upon reaching the wharf we learned that during our absence a transport had arrived from Santiago, and to make room for her the *Lewiston*, to our great disappoiutment, had been ordered out into the bay. I should say, in passing, that there was ouly one dock at Montauk large enough to serve a steamer of the *Lewiston's* dimensions. Procuring a boat we went aboard, and left word with those in charge for an early call. Up bright aud early, we ran across a floating dock belonging to the New London steamers, and luckily enough secured it for the *Lewiston*. We had our ship signalled into her new berth aud begau preparations for receiving our patients. The ladies' saloon of the *Lewiston*, containing thirty-two berths, was selected as the hospital proper, Dr. Douohue having charge, and to this place we assigned our very sick patients. Dr. Stubbs had charge of the upper deck, starboard side, and Dr. McIntyre looked after the upper deck, port side.

In accordance with General Wheeler's orders we expected the men at seven o'clock that morning, but ten o'clock having passed with no patients, Dr. Standish volunteered to go to the camp and ask the reason for the delay. Meanwhile I concluded to communicate with General Wheeler by telegraph. The general in reply promised that our patients would soon arrive. General Wheeler kept his word; not long after we saw the ambulances coming over the hill to the wharf, so that shortly after one o'clock we had all our patients safely on board.

With one hundred and nineteen men, we left Montauk about 2 P. M. Monday and headed for New London, to which place we had previously telegraphed for needed supplies. At about six P. M. the same day we left New London homeward bound for Boston. Everything went well until about eight P. M., when the groundiug of the ship and sudden stopping of her engines told us somethiug serious was wroug. Rushing out on deck we saw at a glance that the ship had gone ashore in the thick fog and was resting in a dangerous position. The men were assured that no immediate danger threatened, and thereupon kept their places quietly.

The officers of the steamer, taking the usual precautions, sounded her whistles, burned colored lights and fired the signal gun. In answer to our signals of distress a tow-boat came alongside, and the captain, informing us that we were ashore on the Point Judith Breakwater, offered to tow us around inside of it, where the vessel could be beached. The offer was declined, as seven feet of water iu the *Lewiston's* stern had just been reported. Our refusal proved judicious, for, as it appeared later, had we accepted the captain's proposition, serious results would certainly have followed. (Subsequently the owners of the *Lewiston* had her repaired and hauled off the breakwater, but she had to be abandoned almost immediately, in a sinking condition.) Then Captain John Dill came upon the scene with the Poiut Judith life-saving crew, and to him much praise is due. He suggested that a lighter, which was near by, could be brought around inside the breakwater, the meu transferred to it, and then towed to Newport. Thinking his idea an excellent one, we began at ouce our preparations for moving all the patients. The lighter iu place, Captain Dill and his crew commenced building temporary bridges, one from the steamer to the breakwater and one from the breakwater to the lighter. The bridges completed, and Dr. Standish ready with the medical supplies, we transferred the men to the lighter. When at last all was ready, some newspaper men who were with us decided to leave and make for Narragansett Pier. To oue of them I entrusted despatches, one for Dr. Bradford, a second to the chief of police at Newport, asking for assistance there, and another to the train despatcher of the New York, New Haven and Hartford Road, requesting that a hospital train of seven cars be ready for us at Newport. Starting from the breakwater there was a tow of seventeen miles before us, but every one felt more cheerful, for by that time the fog had lifted, leaving the sea calm and the night bright and clear overhead. We made Newport in safety, but found no sigu of the train we had ordered. I hurriedly telegraphed the train despatcher at Boston and learned that we could not have our train for three hours, as the only available one must come from Boston. The question what to do with our patients, about eight of whom were in a dangerous condition, seemed puzzling, to say the least. I determined, if we must wait, to send the dangerous cases to the Newport Hospital, but some one suggested that we might use the cars in the station for a hospital train, so I immediately telegraphed to Boston asking permission. The reply being favorable we succeeded, with the assistance of the chief of police, and other kind citizens of Newport, in getting the cars ready for the New Loudon train which reaches Newport at 3.30 A. M. The run from Newport to Boston was without incident, the train moviug into the station about 5.30 A. M. Tuesday morning. Dr. Bradford was on hand to take charge of the men, and into his care we delivered one hundred and nineteeu men in as good condition, I hope, as when received by us at Montauk.

THE WORK OF THE MASSACHUSETTS AMBULANCE CORPS ON THE STEAMSHIP "LEWISTON" AND ELSEWHERE DURING THE SPANISH WAR.

BY MYLES STANDISH, M.D., BOSTON.

When the Congress of the United States at the outbreak of the Spanish war passed an act creating a volunteer army of 300,000 men it utterly omitted any medical department except one surgeon for each army corps, division, and brigade, in addition to the three surgeons and hospital stewards provided for each regiment. Apparently no provision was made for enlistment of privates in the medical department for use as nurses or ambulance-corps men. It seemed to be forgotten that there would be either wounded men or sickness to care for. This act prevented the ambulance corps of the Massachusetts Volunteer Militia from entering the volunteer service during the war. When the first call for troops was made the Surgeon-General of the United States Army requested Massachusetts to furnish 135 hospital-corps men and 15 hospital stewards. As I had been commander of the ambulance corps of the Massachusetts Volunteer Militia for nearly ten years, I was detailed by the governor to enroll the men thus asked for. We had many applications by men more or less fitted for such service. These applications included male nurses, cooks, drivers, some medical graduates and many medical students — not a few of them students of the Harvard Medical School. Most of them, with very little training, would have made excellent hospital-corps men. We received more than two hundred and fifty applications, but three days after we had undertaken this work a telegram was received from the Surgeon-General of the Army stating that under the law there was no authority for the organization of such a corps, and directing me to dismiss the men. Some three weeks after this I received from the surgeon-general a request that these applicants be enlisted in the hospital corps of the United States Army, with the promise that they should be discharged at the end of the war. The men by this time had scattered far and wide, and such as could be reached did not take kindly to the proposition. Many of the young men, medical students or others, who would have been glad to have enlisted in the volunteer army, when asked to enlist for three years as a private in the regular army of the United States declined to do so. This was of course natural and entirely to be expected. Some 20 men, nearly one-third of the ambulance corps, however, accepted these conditions and did so enlist; but it is not with what they did, but with what was done by the ambulance corps at home in assisting in the work of the Massachusetts Volunteer Aid Association that we have to do this evening.

You are all familiar with what they did in unloading hospital ships and trains in the city of Boston. In the course of six weeks the whole or details of the ambulance corps were ordered out on eleven different occasions. To these calls the men responded promptly, generally with only a few hours' notice. On one occasion ten men were required at an hour and a half's notice and they arrived at the train promptly, equipped and ready for duty. They not only came promptly but performed their work, which was often very laborious, efficiently and willingly. Of course all this duty was a great interruption in the business of the men and that of their employers. At one time a portion of the men were on duty four days in one week and three days in the following week. As these men are principally clerks and others on salaries, it is gratifying to state here that their employers cheerfully and willingly allowed them to leave their places of business whenever requested, with a single exception — in which case the employé was a young man in a national bank in an adjoining suburban town.

The most notable work of the corps was that done in connection with the trip and wreck of the steamship *Lewiston*. Twenty of the enlisted men of the corps went on this ship to Camp Wikoff, Montauk Point, to bring to Boston such sick and fever-stricken patients from Massachusetts regiments or others as it seemed best to transfer to Boston hospitals. On the 5th of September we received on the steamer *Lewiston* 119 sick soldiers. These men were delivered by ambulances at the head of a long pier, and a very considerable number, who were unable to walk the distance to the boat, were brought aboard on litters. Their names and organizations were taken by the surgeons in charge, and the men assigned to quarters in the cabins and staterooms of the vessel. The members of the ambulance corps were divided into two reliefs for the care of the sick, and, although for many of the ambulance corps this was a first experience in anything more than the theoretical care of the sick, they did their work promptly and intelligently, winning warm commendation from the surgeons in charge. About nine o'clock that night, in a light fog, the ship ran full speed onto the jagged rocks of Point Judith Breakwater, several miles from land. It is said that a soldier in a battle knows nothing of what is going on except the part taken by himself and by his immediate comrades on either side of him. So, I think, it is in all great disasters of this sort — what any one man knows of what happened is limited to what he himself saw and did. My account, therefore, of this incident is necessarily limited to that portion in which I took part. I was standing on the forward deck at the time of the accident, and when the line of rocks came into view could scarcely believe my eyes. I walked to the bow of the boat to see what we were approaching. As I arrived there and leaned over the rail the ship struck; she was going at full speed, and the bell in the engine-room did not ring until the moment the accident occurred. The force of the blow was very considerable. The men in care of the sick were thrown from their feet, and the ship was pushed some fourteen feet up onto the rocks. The officers of the ship threw a rope over the bow and swung themselves down onto the rocks. It was soon evident that if those of us who were in charge of the sick were to know what had happened we must investigate for ourselves; therefore, I also slid down the rope onto the rocks, and with a lantern investigated the damage. I discovered a large opening through which a very considerable volume of water was rapidly pouring into the ship; meantime a cannon had been fired and whistles blown.

Relief soon arrived in the shape of a tug which had been at work on the construction of the breakwater. On this tug came one Captain Dill, a United States inspector of construction for the breakwater. He proved to be just the man for the occasion. Knowing that there was a large lighter a short distance away, which had also been used in the

construction of the breakwater, he soon had it brought and placed opposite the ship on the inside of the breakwater. With the lighter came a gang in the employ of the contractor. These men cut a large aperture in the side of the ship near the bow on a level with the main deck. There were on the ship, as I have said, 119 sick men, of whom 60 were physically unable to get up from their bunks and dress themselves. I was told that there was one hundred and twenty feet of water under the stern of the ship and that it was then high tide, and it became a question as to whether we could disembark these sick men before the ship would slide from her position on the rocks and perhaps founder. There was absolutely no confusion. The doctors in charge and the ambulance-corps men on duty all remained with their charges, and worked as rapidly as possible in dressing the sick soldiers. The sickest patients had been placed in the open cabins; those in the staterooms were supposed to be more or less convalescent. When it was determined to disembark the men, I went through the staterooms and directed each man to get up and dress himself, if he could, to gather together his small belongings, to take his life preserver and camp stool and sit in the cabin alongside the door of his stateroom, and to remain there until called. The discipline on the part of these convalescents is well worth mentioning. Although it took the larger part of an hour to carry the articles required aboard the lighter and to take off the sickest men on litters, every time that I looked up onto the saloon floor each man was sitting by the door of his stateroom leaning against the wall, apparently quiet, and I saw no two or three grouped together and talking, or leaving their position to go out and look over the side of the ship to see what had happened. There they patiently waited until called to leave the ship, although the lurching of the vessel must have been anything but reassuring.

When it became evident that the men must be taken off, I saw that it would be necessary to have hot food provided to take with us. Going immediately to the galley, where were a half a dozen colored cooks — some belonging to the vessel, others hired for this special trip — I found them helping themselves to whatever lay about, and raking down the fires preparatory to leaving the galley. I explained to them the necessity of carrying hot malted milk, bouillon, coffee and other articles of food with us, and demanded that they should remain and prepare them. To their credit be it said, they promptly returned to their work and prepared everything ordered without remonstrance or disposition to shirk. I then took the relief of the ambulance corps that was off duty and stripped staterooms and cabins of mattresses, blankets, sheets and coverlets, and had them thrown over the bow of the ship upon the rocks and thence taken aboard the lighter; meantime the contractor's gang and some of the deck hands were attempting to construct a sort of bridge from the opening in the side of the ship to the jagged rocks and thence to the lighter on the other side of the breakwater. By this time a crew of the United States Life-saving Service arrived and immediately took a hand in the work, displaying a quiet efficiency and discipline which won my unbounded admiration. This bridge was constructed of shutters, planks, doors, mattresses and anything else that could be obtained, and was in no way a stable or secure structure, its insecurity being heightened by the constant lurching of the ship, yet over it the men of the ambulance corps carried sixty sick men on litters without accident or incident. The footing was exceedingly precarious, as one plank would be firm and stiff, and the door alongside of it insecure and often at a considerably different elevation. During this disembarkation the men of the Life-saving Service stood at the side or under this structure in most uncomfortable positions, holding it up with one hand and with the other steadying the litters as they were borne past. They did this with such steadiness that I scarcely saw one change his position through the hour or more of disembarkation. After the sick had been taken off the ambulance-corps men transferred to the lighter cans of cooked food, which had been wrapped in blankets in order to preserve their heat. All the medical equipments, bedding and clothing, which had been sent by the Volunteer Aid Association, was also transferred to the lighter, and when all the patients had been disembarked the scene was one of almost theatrical strangeness. On the deck of the lighter the mattresses were placed side by side as closely as possible, and upon each lay a sick soldier carefully wrapped in blankets and other coverlets. The lighter was then towed to Newport and the patients were disembarked on litters with their mattresses and placed in the waiting-room of the Old Colony Steamship Company. A train of baggage and other cars was soon assembled, stripped of its contents by the men of the ambulance corps, and the sick, again carried on litters, were placed on mattresses upon the floors of these cars. The work of getting the patients on the train was lightened by a detail of twenty Newport policemen, who had reported in response to a telephonic message.

The care of the sick on the train during the trip to Boston was one of considerable difficulty. Many of the men were ill with dysentery or diarrheal diseases, which added to the difficulties of the situation; nevertheless, the men of the ambulance corps did the work cheerfully and well, and when the train arrived in Boston and the men had been delivered to the ambulances which the Volunteer Aid Association had in waiting I was much pleased to learn that none of the sick men or any of the surgeons had asked for anything in the way of food, medicine, or other requisite that had not been found to have been brought from the ship and placed upon the train, and also that none of the very ill were apparently the worse for this unexpected experience. The men of the ambulance corps were then dismissed, having had, on an average, less than three hours' sleep in the previous forty-eight hours.

MASSACHUSETTS VOLUNTEERS AT CAMP THOMAS.

BY J. B. BLAKE, M.D., BOSTON.

On Friday, September 9, 1898, I was requested by the Massachusetts Volunteer Aid Association to find two assistants and go to Camp Thomas, Chickamauga, to bring home as many of the sick of the 8th Massachusetts Volunteers as were able to travel. I was fortunate enough to secure the aid of Dr. H. J. Perry and Dr. G. F. McIntyre, and we started on the evening of Saturday, September 10th. The Association gave us a complete list of all Massachusetts soldiers

who were then in the Chickamauga Hospitals; and Adjutant-General Dalton kindly furnished a document which attested to our official characters; and we departed, anticipating an easy and pleasant journey.

We passed through the mountains of North Carolina by night, and found ourselves in the long, shambling, wooden station of the Southern Railroad at Chattanooga at 6 A. M., Monday, September 12th. Camp Thomas was situated at Chickamauga Park, the site of the battle, and about twelve miles from Chattanooga. Whatever criticism may be made of the water and the soil, certainly none could be offered concerning the beauty and the appropriateness of the position. On one side were the towering heights of Lookout Mountain, stretching for miles and miles towards the south, on the other the wooded hills of Missionary Ridge, and, behind, the portals of the great cemetery. At almost every point of the compass the eye rested upon objects which must have been a potent inspiration to the volunteer. The city of Chattanooga itself was at this time a most interesting study. Four months before, with a population of perhaps 45,000, it was by no means in a flourishing condition. Suddenly an army amounting at one time to 55,000 men — considerably larger than the city itself and three times the size of the army at Santiago — was dumped at its door, with all the needs that such an assemblage possesses, and with ready money to satisfy those needs. Business men of the city assured us that from $5,000,000 to $7,000,000 poured into Chattanooga in those three months, with an average profit of perhaps 50 per cent. — no discount for patriotism. As a result, the city had a boom somewhat resembling that which now and then strikes a Western mining camp.

We now began to realize for the first time the effect of location upon the interest centering in the war. In Boston, forty hours before, the thought and talk and newspaper headings were about the navy and its doings, and the men in Cuba. At Chattanooga the navy was seldom a topic of conversation, and the army was supreme, particularly that part of the army which was, or had been, at Camp Thomas. Even the soldiers at Santiago were regarded as of rather secondary importance, and long columns of controversy about drinking-water and camp supplies and the advantages which Tennessee possessed over Kentucky filled the papers. And, strangest of all, we discovered a regiment of Rough Riders, to whom Teddy Roosevelt's name was only a collection of letters.

The problem before us was to find the Massachusetts soldiers, obtain furloughs for all able to travel, and then make arrangements for private cars and for proper food on the return trip. This seemed simple enough, but two difficulties immediately presented themselves: (1) to get the cars, and (2) to find the men. About 45,000 soldiers had been moved in the three weeks preceding our arrival, and the few remaining were going at the rate of 3,000 a day. Every available car for thousands of miles had been sent away, and for twenty-four hours it was impossible to get a car of any sort, or indeed to get news of one. The agent of the Southern Railroad was very kind, and finally succeeded in finding one for us. We had hoped for a dining-car, but this was entirely out of the question, and we were finally glad to get a buffet, which was stocked with extra stores.

The second difficulty presented itself when we went to Camp Thomas itself, three-quarters of an hour by rail from Chattanooga. We found, not a large open field, like an enlarged Framingham muster ground, but a good-sized territory of wooded, rolling country, about ten miles long by six wide, covering an area about one-half the size of the District of Columbia. This was the first surprise. The next was to find that the three hospitals at which the Massachusetts men were stationed were from one and one-half to three miles apart, and that an amount of confusion and ignorance existed in regard to them that makes one shudder to think what the condition must have been at Santiago. We were assured by several officers that the Third Division 1st Corps Hospital was already disbanded, and that the Massachusetts men were distributed to the Leiter and Sternberg Hospitals. Arriving finally at the Sternberg, we were greeted kindly by Major La Seur, who told us that he had but three Massachusetts men, and only one of them could travel. We then took a drive of one and one-half miles to Leiter, over the dustiest of roads, to find that only a single Massachusetts man was there (whom we afterwards brought home). At the Leiter we met Lieutenant-Colonel Hoff, a courteous gentleman, who explained to us that the 1st Corps Hospital was not disbanded, that it had most of the Massachusetts men, and that it was three or four miles back in the direction we had just come. Retracing our steps, or, rather, hiring a team, we finally arrived there, and found that it contained about thirty-five Massachusetts men, and that a complete list of all those able to travel would be ready on the following morning. After looking through the tents, and chatting with the surgeons, we returned to Chickamauga tired and dusty, and impressed with the fact that the amount of territory comprised in Camp Thomas, large as it was, was small in comparison to the amount of confusion that existed within it.

While on the way to the 1st Corps Hospital we passed the 9th Michigan Volunteers, in full marching order, proceeding on foot to the station to go home on furlough. It was a most interesting sight. The men were in high spirits, and tramped along in the heat unmindful of the heavy kits. There was much clanking of canteens and guns, and much singing and talking, which the irregular route step only emphasized. The officers allowed a good deal of freedom, and some of the men had new-blown cotton blossoms in their caps. Many looked sick and tired, and it seemed as if the three miles in the dust and heat to the station would try their endurance severely; but the thought of home is a wonderful stimulant. The long line swung slowly up the rolling hills and disappeared over the top like a huge brown snake. Later, on our way to the city, we were stopped by the train containing this regiment. It was by far the longest I had ever seen, consisting of thirty-one passenger-cars and a sleeper, and it broke in two on a slight grade ahead of us and delayed us an hour. The men, however, were still laughing and singing.

On Tuesday the buffet car was secured, and the Southern Company agreed to send it out to Camp Thomas, haul it to the Leiter Hospital, where a single Massachusetts man was to be put aboard, and then bring it back to Battlefield Station, the principal station of the camp, where the other men would embark. In the morning Dr. Perry went again to the 1st Division Hospital, ascertained the number of men who were able to go, and arranged with Surgeon Myers for their transfer in camp ambu-

lances from the hospital to Battlefield Station. The car thus loaded was to be hauled to Chattanooga in time to catch the express which passed through at 3 o'clock Wednesday morning. The reason for this early start was that this train alone made through connections for Boston without delay or change of cars, and this route was the shortest possible.

Every sick soldier is furloughed before being allowed to move from his hospital, and the Government furnishes transportation with the furlough. In the case of sick men the rule is that they shall be sent home by the shortest route. Taking it for granted that this would be properly done, and knowing that the Southern was the shortest and most direct road, I did not oversee the routing of the furloughs. This was a bad mistake, and almost upset the entire plan. A civilian clerk did the routing, and made out the transportation for another road, one hundred and twenty miles longer, which would have required eight or ten hours more by rail, and this was only discovered as the soldiers were unloaded from the ambulances and ready to go aboard the car, and when the offices of the commissary department were closed. The alternative seemed to be either to go by a long route, or to put the soldiers in the car and hold them over for another day. Finally, Mr. Billufs, the Southern Transportation Agent, brought me to Quartermaster-General Lee, who, after a long and careful examination of the whole case, on his own responsibility, changed the entire plan and allowed us to depart with our men before midnight. At Chattanooga we took on board extra milk, soft foods, and medicines, were attached to the Northern express and started homeward at 3 A. M.

We had altogether twenty men, most of them convalescents from malaria and dysentery, with a few typhoids. The lists, giving condition and treatment at the field hospitals, were for some reason not delivered to us, and we had to take the statement of the soldiers themselves on questions of diet. To be on the safe side, we gave them only milk and liquids, with a few crackers, for most of the first day, and kept them in the bunks as much as possible; but towards evening they became so hungry, and protested so strongly that the diet at the hospital had been far more generous than that on the train, that we allowed them soup and a little chicken, marching them into a dining-room at one of the stations and watching them as they ate. The amount of milk they consumed was astounding, and we were continually telegraphing ahead for supplies to meet the train, or borrowing from what we found in the baggage car. At times we were disappointed. We telegraphed to Biltmore, where George Vanderbilt's large estate is situated, only to find that the telegram had not been delivered, and that the milk which we needed very much was not forthcoming. Within the first twenty hours the men drank more than twelve gallons of milk, and simply exhausted the supply of suitable food in the buffet. The problem of satisfactorily feeding twenty convalescents from a buffet car in the South is not so simple as it at first appears. It was extremely difficult to keep the soldiers from eating anything and everything they could lay their hands upon; lunch counters had to be watched at the stations, and finally the train boy excluded from the car, in order to keep indigestible foods out of their reach; yet in spite of our caution, I fear at times they were allowed too much.

An illustration of what may happen when sick soldiers travel home alone occurred on the day after leaving Chattanooga. We found a convalescent from the 8th, who was furloughed after malaria and dysentery, from Lexington, Ky. He was in one of the forward cars on our train, and was just ordering lunch as I came through. It consisted of a soft-boiled egg, toast and weak tea, and ended with a preserve of sugared figs with cream. I suggested that this was rather tempting Providence; but the young soldier refused to sacrifice the figs, and politely remarked that he was not under my authority. So I left him, saying I should come when he sent for me. He sent in a hurry in about two hours, and in return I sent him to the Boston City Hospital that evening for two weeks.

The only other incident on the homeward trip was the discovery that our buffet car was one and one-fourth inches too high for the overhead bridges of Connecticut and Massachusett, and on account of this small margin we were compelled to change cars at Jersey City. Up to that time we were not aware that only cars of a certain prescribed size could travel east of New York. This seems to be an unusual and rather unexpected relic of New England narrowness.

We arrived in Boston at 9 P. M., September 15th, one hour behind time, and having covered about 3,000 miles in five days. Doctors, ambulances and a crowd awaited us, and we saw an excellent demonstration of the solution of the problem of receiving and distributing sick soldiers in Boston.

The hospitals at Camp Thomas as we saw them were clean, well supplied, and not overcrowded. The Leiter Hospital, which was situated in a large hotel, might be compared favorably with most city institutions, and the field hospitals, so far as a rapid examination went, were in a satisfactory condition.

THE RECEPTION OF THE SICK SOLDIERS IN BOSTON.

BY F. G. BALCH, M.D., BOSTON.

THE reception and transportation of soldiers here in Boston was an entirely new problem to us, and as the system which we finally used was the outcome of our experience with several shiploads and trainloads of sick men I shall not try to speak of each occasion on which we had such work to do, but of the plan which we finally found most satisfactory in use. When Dr. Bradford was notified that men were to be sent to Boston or were already on the way there several questions arose which had to be solved promptly: (1) How many men were coming? (2) What was their condition? Here we recognized two classes, that is, those who could sit up and those who must go in ambulances. These classes were again subdivided into those who could bear transportation some distance and those who must be taken at once to the nearest hospital. (3) What could we get to transport them in? (4) How many could each of the various hospitals in and about Boston take in?

To take up the first question: We knew how many the *Bay State* could carry, and we were sure that she would have her full complement, that meant from 100 to 130 when we had to meet her. In the case of the *Olivette*, the *Relief* and the different trains, Dr. Bradford was able to find out by telegraphing, though in some cases the number we were to expect was a little indefinite.

The matter of the men's condition was a harder thing to find out. We knew in a general way that a load from Santiago meant a much larger proportion of very sick ambulance cases than a load from Porto Rico or Montauk, but it was usually impossible to tell exactly until the boat got to quarantine and Dr. Bradford had a chance to telephone us.

Boston is well supplied with means of transportation of sick soldiers, and the ambulances can be gotten together almost as rapidly as the fire apparatus. We never used quite all the ambulances which we could have had, but we had a goodly array on several occasions. The police ambulances have a single large stretcher in them, but that can be taken out and by laying a mattress in them they can carry two men each. In the case of the *Bay State* we did not move some of the sickest men at all, but they were sent to the hospitals on the frames which were the beds on the boat. The City Hospital ambulances also carry two, and have two very convenient short canvas stretchers in each ambulance. The patient is put into the ambulance on these and they remain under him. This saves two moves. The Massachusetts General Hospital ambulances carry two men, by using a mattress, but did not have the canvas stretchers. The Homeopathic ambulance carries two on stretchers. The Marine Hospital and Naval Hospital ambulances each can take two on a mattress, but did not have the canvas stretchers. For patients able to sit up we used the large diligences of the Armstrong Transfer Company and of the Boston Cab Company. The former carry comfortably about a dozen and the latter a few less. They ride rather hard unless pretty well filled. We used hacks to a limited extent, especially for the men who needed an easier running conveyance than the larger vehicle, and when we did not have a full load for one of the larger wagons. There was room for one man in the ambulances on the seat beside the driver. The Long Island Hospital cases were sent down on the *J. Putnam Bradlee.*

The City, Massachusetts General and Carney Hospitals all had tents in addition to the wards, and to these three hospitals and the Homeopathic Hospital most of the men were sent. The Long Island and Marine Hospitals also took a good many men. St. Margaret's and the Charity Club Hospitals offered to take soldiers, as did also the Eye and Ear Infirmary, but we did not have to call upon them. In addition to these near hospitals many others in the surrounding towns offered to take men, and many patients were sent to them after a few days in Boston. We had a list of thirty-eight hospitals which could and would take soldiers, and there were several other institutions where men could have been sent in an emergency. By the time the boats got to the wharf we knew just where we could place any number of men they could have on board, and usually two or three times as many as they could carry. We were caught unawares once, when the *Relief* came by quarantine without stopping, and the first we knew of her she was at the Plant Line dock. After that we were notified by the Chamber of Commerce, and knew as soon as the boats entered the harbor. Dr. Bradford went down on the *Vigilant* every time, except in the case of the *Relief*, and boarded the vessel at quarantine. In the meantime he had notified whoever was in charge of transportation, and that man had gotten his assistants together, either at the Volunteer Aid Association or at the wharf where the vessel was to dock. Each man had a list of people to be notified, such as the police, the ambulance corps, the hospitals, the cab company, the wharf, etc., and as soon as the boat was reported all of these people were warned to hold themselves in readiness. We telephoned to them again when we knew the hour the boat was expected at the wharf. The crowd of friends at the wharf was a more difficult problem, but with an efficient sergeant of police and a rope to keep the crowd back it was much simplified. No one but reporters, assistants and friends of sick soldiers should be allowed on the wharf at all, but this is a hard order to carry out. In the yard the ambulances and wagons were backed into position to take patients at once, and so that you could send a wagon out from any part of the line without disturbing the rest. No private carriages should be allowed in the yard. The ambulances were drawn up nearest the gang-plank, so as to make a short carry for the ambulance-corps men. There should be two mattresses on the wharf, so that in making the transfer from the ambulance-corps stretcher to the ambulance stretcher the patient need not be laid down on the board floor.

If we knew there were 100 men coming, and the City and Massachusetts General Hospitals could each take 40, and the Carney Hospital could take 20, we made out cards for each hospital with numbers running up to these figures. These cards, which were of different colors, had the name of the different hospitals printed on them. In this way we had an exact and easy method of knowing at a glance how many men we had sent to each hospital. The colors gave a quick means of knowing which hospital a man was to go to, and facilitated the work of the ambulance corps and the man in charge of transportation. A man on one side of the gang-plank gave out the cards, while a man opposite him took the patient's name, and put down which hospital he had been sent to, so that we could have it for the record. For this work of assignment two men are needed, and a third should have charge of transportation. There should be at least two assistants in addition, whose duty it should be to run between the man in charge of transportation and the man who is making the assignment, in order that the wagons may be filled to best advantage. The ambulance corps was very useful and efficient in carrying the men from the boat to the conveyances, and in some cases in riding to the hospital with the very sick cases. In the case of the *Relief* the doctor in charge was anxious to have all those who were to be sent to one hospital sent there before we began on men for another hospital. This has advantages as well as disadvantages. It is simple, but made a considerable wait for carriages when we had to send several on such long trips as to the Carney or Marine Hospitals. On other occasions all the ambulance cases were sent first, or all the convalescents first. The transportation is quicker if the two classes of cases can be sent alternately, so that the wagons have a chance to get back. All the ambulances were used without regard to the hospital they came from. In all nearly 1,000 men, some of them desperately ill, were taken to the hospitals, and without a death in transit. The best record for speed was made in the case of the *Bay State's* second trip. There were 99 men, though few ambulance cases, and the whole of them were on their way to hospitals in less than an hour after the boat tied up to the wharf.

REPORTS OF COMMITEES.

REPORT OF COMMITTEE ON SURGICAL INSTRUMENTS AND X-RAY APPARATUS.

BOSTON, June 19, 1898.

DR. H. L. BURRELL:

Dear Sir, — The Committee on Surgical Instruments and X-ray Apparatus would report that they have made a list of necessary surgical instruments, which is appended to this report. These instruments can be obtained from Tilman & Co. for about $527.15.

In addition to these, they would recommend that two field operating cases, such as are issued to the Massachusetts Militia, be carried in the ship, and they think that it would also be well to carry a United States Army compact field set. The latter would cost about $130. The cost of the small Massachusetts Militia field set has not yet been ascertained.

They think that in x-ray apparatus a static machine would be of no use in hot, damp climates, and a complete coil apparatus would cost from $450 to $500.

The total cost of this surgical outfit would be then approximately $1,222, but would probably somewhat overrun this estimate if a liberal supply of sealed and sterile suture materials are carried.

Respectfully yours,

A. T. CABOT, *Chairman.*

COMMITTEE ON INSTRUMENTS.

Knives:	
3 catlings	$11.50
5 amputating, 1505, 1506	18.50
36 scalpels, 1512, 1513, 1514, 1516	54.00
2 Burnett's mastoid knives	3.00
Saws:	
Skull saw, 1539	1.75
2 bone saws, 1529	17.00
2 metacarpal saws, 1521	5.00
Chain saw, 1609	10.00
Tenaculum	1.25
Forceps:	
3 polypus, 2197	
12 Coxeter's, 1443	12.00
36 snaps, 1485	90.00
6 dressing forceps, 1288	9.00
3 double hook forceps, Vulsellum	9.00
Bone Forceps:	
3 gnawing, 1598, 1599	10.50
2 cutting, 1594	8.00
1 gnawing for skull, 1590	8.00
2 lion forceps, 1567	6.00
2 sequestrum, 1568, 1571	5.50
Scissors:	
4 angular, 1404	6.00
4 curved on flat, 1405	6.00
12 straight, 1406	12.00
4 bandage scissors, 3878	18.00
Catheters:	
3 silver, Nos. 12, 10, 6	5.75
24 soft rubber	6.00
24 gum elastic, Nos. 12, 10, 8, 6	6.00
Miscellaneous:	
3 aneurism needles, 1463	2.25
36 probes, 1343; some of these long	15.50
3 Nelaton probes	1.80
12 directors, 1344, 1345	7.25
2 Sayre's periosteum elevators, 1583	4.00
2 set of trochars, 1718	9.00
1 aspirator, 1735	14.00
Exploring syringes	
2 chisels	7.00
2 gouges	7.00
3 curettes	2.50
8 retractors	17.50
Rubber tubing, various sizes; $0.10 per foot	10.00
Syringes, 2 sizes, hard rubber, Davidson and fountain	2.00
Silkworm gut, 10 hanks	17.50
Needles, Hagedorn (?) 5 dozen	3.75
Silk, 30 cards	3.00
Catgut, 10 bottles	7.50
Bone drill (Hamilton's), 1629	7.00
" " (Brainard's), 1625	3.50
6 tracheotomy tubes	36.00
3 " dilators	10.00
6 urethral sounds, 2930	7.25
12 " bougies, 2927	6.00
36 thermometers, 1013	72.00
2 stethoscopes, 1036	9.00
2 grooved staffs, 2119	4.00
18 hypodermic syringes, 1697	54.00
4 esophageal probangs, 2607	4.00
3 bristle probangs, 2613	4.50
1 esophageal forceps, 2616	5.00
1 head mirror, 2438	6.50
2 clipping machines	5.50 (?)
3 razors	
2 trephines, 1533	9.00
Silver wire, two Massachusetts field cases and rubber tube and more ligatures.	
Wire cutters, 3278	3.50
Miscellaneous:	
6 extracting forceps, 1217	9.00
1 set ear specula, 2002	2.50
2 paracentesis needles, 2099	2.00
4 ice bags	12.00
Hot-water bottles	
3 stomach tubes, 2621	4.50
Coil machine	450.00 to $500.00
Static machine, no good.	
	$753.05
30 per cent.	225.90
	$527.15

REPORT OF THE SPECIAL COMMITTEE ON STERILIZATION OF SURGICAL MATERIALS.

In presenting this report the Committee desire to say that it is only general and preliminary in its nature and therefore does not go into such minute details as will be necessary before the furnishings are bought.

It is desirable that the sterilizing plant be placed convenient to the distilled-water supply, and that certain steam fittings and the adjustment of steam pressure to the needs of the apparatus mentioned be made. These steam fittings and adjustments are not included in the estimates given, neither are chemicals and antiseptics.

It is desirable that necessary furnishings liable to become out of order shall be duplicated, and provisions for this have been made in the following estimates:

STEAM STERILIZERS.

A first-class medium size iron diminished steam pressure sterilizer can be obtained from the Kny-Scheerer Co., of New York, for $390 list, namely, the Kny-Sprague "Perfection" Sterilizer No. 4, Class "A."

In addition to this, the Committee recommend that the Massachusetts Volunteer Aid Association ask the Trustees of the Boston City Hospital to lend them their old sterilizer, at present not in use.

If desired, a serviceable and simple sterilizer, after the pattern of the one now in use at the Massachusetts General Hospital, and one which can be easily repaired on board ship, can be made to order for about $122.

The Committee recommend that the Association select according to their best judgment two out of these three pieces of apparatus suggested. As auxiliary sterilizing apparatus and for use on shore, three rectangular Arnold Sterilizers, price, all of copper, $8 each, are recommended.

For heating and boiling, two steam coils arranged side by side as a stove, cost with steam fittings, approximately, $———.

The following list of agate-ware, either in blue or white enamel finish, is recommended. The wholesale price-list of the Lalance & Grosjean M'f'g Co., is sent in with this report for reference:

2 steam kettles, for boiling solutions	$11.48
2 fish boilers, for instruments	2.40
6 stock solution pots	4.50
4 stock jars	11.24
2 doz. basins, large and small	6.30
1 doz. pails	16.80
1 doz. plain pitchers	8.40
1 doz. pitchers with funnel spout	12.50
6 water carriers	4.80
5 wire dressing cases	10.00

The following additional supplies are suggested:

20,000 yards No. 2 gauze	$360.00
100 pounds of absorbent cotton	15.00
1,000 sheets of sheet wadding	30.00
500 yards unbleached cotton	27.50
3 pieces diaper cloth for sterile bundles	6.28
50 half-sheets for sterile bundles	18.00
400 towels for sterile bundles	40.00
24 operating coats	30.00
2 rolls of paraffine paper	2.00
2 500-yard rolls oiled muslin bundles	4.00

The following suture and ligature material is recommended:

2 ounces of silk, Nos. 3, 4 and 6; 20 ounces of silk, No. 10; 5 ounces of silk, Nos. 12, 14; 25 bunches of silkworm gut; 50 coils A No. 1 catgut, sizes 1, 2, 3, 4; 3 ounces of silver wire, Nos. 20, 24 and 26.

Estimated cost for this amount $90.00

Needles:

10 packages of intestinal needles, bought at Emerson's on Temple Place	$1.00
2 gross Hagedorn needles	12.00
2 gross of curved needles	7.00
3 gross of straight needles	10.00

In addition to these supplies there must be considered fittings, tables, lockers, racks and furniture, costing approximately $150.

The approximate total cost of these recommendations, if the first-class Kny-Scheerer Sterilizer is selected, will be $1,378.45; if a cheaper sterilizer is adopted, perhaps $200 less.

All of which is respectfully submitted.

For the Committee,

William P. Bolles,
Farrar Cobb.

Signed in the absence of the Chairman and with his approval.

REPORT OF COMMITTEE ON CLINICAL LABORATORY.

The purpose of the clinical laboratory is: (1) To assist in diagnosis. It will be important to distinguish definitely between the different forms of malaria, and to recognize typhoid fever, diphtheria and tuberculosis; with these four excluded, the diagnosis of yellow fever becomes easy. (2) To determine the different forms of wound infection; for this a bacteriological outfit is necessary.

The analysis of water for bacteria will not be necessary. The ship should be provided with distillation apparatus, and nothing but distilled water should be used as water supply; this is absolutely essential.

The whole laboratory outfit need not occupy a great deal of space. A desk five or six feet in length can be built and fitted with compartments and drawers for the culture media, apparatus, etc.; on the desk can be placed *fixed* marks for test-tubes, urine glasses, reagent bottles, etc. There must be sufficient light for microscopic work. It will be well to arrange for autopsies and the securing of material.

Appended is a list of the fittings considered necessary and of their approximate cost:

1. Microscope (Leitz), objectives 3, 7 and oil immersion 1-12. Oculars I and III, $95 to $125. This microscope can be sold, when no longer needed, at 50% to 75% of its original cost.
2. 6 tested cultures of the typhoid bacillus; these to be hermetically sealed. (Can be obtained free of charge.)
3. 1,000 of the best heavy test-tubes, sterilized and stoppered. (These can be packed between layers of sterilized cotton.) $8.00 to $10 per thousand.
4. 2, 500 c. c. flasks of bouillon, sterilized and sealed, $2.00 to $4.00.
5. 20, 500 c. c. flasks of agar, sterilized and sealed, $40 to $80.
6. 2 round wire baskets for holding test-tubes, $1.00 to $2.00.
7. 100 test-tubes of blood serum, sealed with cotton, $2.00 to $3.00.
8. 1 lb. of glass rod, $0.50.
9. 4 ft. of platinum wire, No. 22 Stubb's scale, $6.00 to $8.00.
10. Wire swabs sterilized and in a single receptacle, that is, not individual receptacles, $1.00.
11. 1,000 glass slides (3″ x 1″), $7.00 to $9.00.
12. 5 oz. of ¾ inch No. 1 cover-glasses, $5.00.
13. A desk with drawers and compartments, also with fixed racks for test-tubes (50), urine glasses and reagent bottles, $15 to $25.
14. Autopsy case, $20.
15. 20 gals. of alcohol, 95% (duty free), $12 to $15.
16. 3 large autopsy needles, twine, etc., $1.50.
17. 25 half-pint fruit jars with snap tops, $2.50.
18. 1 oz. Canada balsam, $0.50.
19. 2 ozs. cedar oil, $0.50.
20. Bacteriological stains, (*a*) Lœffler's blue, (*b*) Carbol fuchsin, (*c*) Gabbet's decolorizer, $5.00.
21. Cornet forceps, $3.00.
22. Thoma-Zeiss blood counter, $17 to $18.
23. Nest of porcelain evaporating dishes (up to 9 cm. in diam.), $5.00.
24. 8 test-tube brushes (for cleansing), $0.30.
25. Large Arnold steam sterilizer (copper), $3.00 to $5.00.
26. 3 thermometers (100° C.), $3.00 to $5.00.
    1 thermometer (200° C.), $1.00 to $2.00.
27. 6 T. K. patent dropping bottles, $3.00.
28. 20 c. c. Lugol's solution, $1.00.
29. Filter paper, 1 ream, $2.00 to $3.00.
30. Toisson's fluid, 100 c. c., $0.50.
31. Book, "Mallory and Wright's Pathological Technique," $2.00 to $3.00.
32. Blanks and books for recording bacteriological, urine examinations, etc.
33. 500 c. c. nitric acid (C. P.), $25 to $30.
34. 200 c. c. of ammonic hydrate, $10 to $20.
35. 200 c. c. of acetic acid (C. P.), $10 to $20.
36. 3 urinometers and urinometer glasses, $1.50 to $2.00.
37. Fehling's solution, the two constituents to be bottled separately.
    Copper sulphate, 17.3195 grains. Solutions
    Water 500 c. c. I
    Sodic hydrate (sp. gr. 1120), 250 c. c. Solutions
    Rochelle salts 86.5 grains. II
    Water ad 500 c. c.
    In the test for sugar these solutions can be used undiluted, $1.00.
    a.—(Choice.) Squibb's apparatus for sugar testing can be obtained for $1.50 to $2.00.
38. 3 alcohol lamps, $1.50 to $3.00.
    Tripods for alcohol lamps, $1.50 to $2.00.
39. 6 urine glasses, $1.50.
40. 6 Collamore wine glasses, $1.50.
41. Centrifugal apparatus, $5.00 to $15.
42. Squibb's urea apparatus, $1.50.
43. Graduated glass cylinders: one 500 c. c. capacity, $1.85; one 250 c. c., $1.35.
44. Litmus paper (blue and red), each ½ quire, $0.75.
45. 2 lbs. of glass tubing, assorted sizes, $0.50 to $1.00.
46. 6 glass funnels, $0.50 to $1.00.
47. Pipettes, 5 of 5 c. c. capacity graduated in c. c. 5; 5 of 2 c. c. capacity graduated in c. c., $1.50.

Total estimate, $286.70 to $401.50.

Respectfully submitted by the Committee,
H. P. Walcott,
W. T. Councilman,
John T. Bottomley.

REPORT OF COMMITTEE ON PHOTOGRAPHS.

Boston, June 17, 1898.

Dr. Burrell:

Dear Sir,—As Chairman of your Committee on Photographs for the fitting out of the hospital ship *Marmion*, I have the honor to make the following report in answer to the suggestions contained in your last letter:

(1) As to the purchase of a camera for use on the ship. To save this expense, two parties have kindly offered to present the boat with a complete photographic outfit, except the utensils for developing and printing negatives.

(2) As to the selection of a site on the ship for a dark-room and the cost of its construction.

The Chairman of the Committee has inspected the ship with Mr. Boyd, the naval constructor in charge. The portions of the ship in which a dark-room could be built are (*a*) the hold, forward or aft; (*b*) the portion between decks in the position in the present plan devoted to wards; (*c*) the after-deck cabin. Mr. Boyd considers that a proper dark-room in any of these situations would cost from $250 to $500, and would, if between decks, cut into the room allotted for patients. The consideration of the fact that if the dark-room were placed in the hold, there would have to be an especial set of plumbing and ventilating arrangements, the cost at that position would be at the maximum.

As there would probably be no great demand for such a dark room, on such service as that which the *Marmion* will undertake, the Committee respectfully suggests that some other room, which would be generally used for other purposes, might be equipped to serve also as a dark-room when needed, which would probably not be often.

The only necessities for a dark-room are running water, ventilation and shutters capable of keeping out all light. The rooms which suggest themselves for this purpose are the new (contemplated) laboratory, the apothecary's department and one of the deck staterooms (preferably the junior medical officer's, who presumably would have charge of the apparatus). The cost of making such alterations would be very little as compared with the construction of a new room.

The following apparatus and reagents would have to be purchased in any case:

Two 11 x 14 trays, two 8 x 10 trays, two 5 x 7 trays, one 11 x 14 printing frame, rodinal 2 quarts, ammonia hydrate, hyposulphite soda, mercuric chloride, bromide potassium, alum, printing paper, self-toning paper, colored lantern, glue, brush, cardboard.

The cost of all the above articles would be about $15. X-ray plates could be developed with the same reagents, and the whole, when not in use, could be packed in a box 15 x 12 x 10.

A hundred x-ray plates of various sizes would cost about $15 or $20. All the utensils and reagents mentioned are carried in stock by the prominent dealers in photographic supplies.

Very truly yours,
E. A. Codman,
Chairman Photographic Committee.

REPORT OF THE COMMITTEE ON SURGICAL APPARATUS.

This report consists (*a*) of the kind and character of the surgical apparatus that should be supplied the ship for the treatment of surgical injuries; (*b*) the extra supplies that should be carried to issue for the relief of the land forces.

The data on which this report is founded is taken from the medical and surgical reports of the War of the Rebellion, especially with regard to the kind of accidents received. In looking over a list of 3,000 wounded, it is found that over

two-thirds of the wounds were of the extremities, and of these, two-thirds, or over 1,500, were of the lower extremities. This means that the report must mainly deal with the mechanical treatment of fractures, either compound or simple, or with the wounds of the extremities of such a nature that practically splints must be applied as if there was a fracture. The Committee therefore classifies the report as follows: (1) the appliances for the preparation of apparatus; (2) the materials for the apparatus; (3) the dressings. This report will therefore present several lists. The first list deals with the supplies and their character. The second list will deal with the quantity, the specifications, where obtained, how packed and their maximum and minimum cost.

Under No. 1 a carpenter's bench is desirable and sets of tools of two sorts. First, a set in a chest for bench use; second, a set in a hand bag to go with shore party, the number of hand bags to be multiplied at Medical Committee's option.

No. 2. — Iron wire, three sizes; sheet tin, internal angular splints, felt shoulder caps, splint wood, adhesive plaster, crinoline, plaster-of-Paris in bulk, strap iron, buckles, cord, weights and pulleys, webbing, crutches, extension for leg, bandage rollers, cradle.

No. 3. — Absorbent waste cotton, gauze, sheet cotton, absorbent cotton, oakum, bandages, gauze and cotton, cotton cloth, Esmarch slings, safety pins, needles and thread, pails, basins, spoons, pus basins.

SPECIFICATIONS AS TO CHARACTER AND QUANTITY.

Quantity. — In making out this list it will be apparent at once that many of the things, having once been furnished, can be used in different ways for different purposes. A certain number of fixed apparatus has been ordered, for example, internal angular splints, shoulder caps, etc., for use when there is not sufficient time to prepare corresponding apparatus from supplies. They are also intended to be used as patterns. This applies, of course, to the tools and to the materials for apparatus. When it comes to dressings, we are here met with a somewhat difficult problem, but the data on which this portion of the report is based was furnished us as to the amount of supplies needed for 25 patients at the Massachusetts General and City Hospitals for a week, and this, as far as possible, has been used as a unit, multiplying for 100 patients a week and for 175 a week.

No. 1. *Carpenter's Bench.* — Dimensions, 6 ft. x 2 ft. 8 in. x 2 ft. 4 in. To be made by carpenters at work on vessel.

Tools. — Set No. 1 in chest to supply carpenter's bench for use on vessel:

Tool chest: "Snips," tin scissors, round end pliers, flat pointed pliers, wire cutters, rivet set, solid punches, copper rivets and burrs (to fit punches), riveting hammer, files (assorted, round, triangular, flat), file handles, soldering tool and solder, acid, resin or borax, gimlets, set of bits, large extension bit, bit stock, 3 saws (different sizes), draw knife, magazine awl with tools in handle, brad awl, smooth plane, block plane, hammer, square, dividers, rule, hatchet, drills, (one set), clout knives, wire nails (assorted sizes), assorted wire nails in box, vise, brass screws (several sizes), gouge, chisel ($\frac{1}{4}$"), chisel (1"), screw driver (small), screw driver (medium), cold chisel, lead block for riveting, counter sink, oil stone, reamers, mallet, oil can, six pencils, tacks (copper), twine, monkey wrench, measuring tape (5 ft.), knives for cutting plaster-of-Paris bandages, scissors for bandages, large shears, automatic borer, pocket knives (3" blade).

Tools. — Set No. 2, for shore use.

Hand bag: Pliers (round and flat point), wire cutters, files (round and triangular), gimlet, small saw, draw knife (with handles to fold back), magazine awl (large size, with tools in handle), hatchet (claw on back to draw nails), tape measure (5 ft.), small tin box assorted wire nails, oil stone, pencil, small package copper tacks, twine, plaster knife, 2 spools copper wire (fine and medium), 2 pairs scissors, 2 pocket knives.

Burditt & Williams, 18 and 20 Dock Square, Hardware, Tel. H. 355: price for bench tools, about $50.00; price for bag tools, about $15.00.

No. 2. *Iron Wire.* — J. A. Murray, 201 Cambridge Street, Boston:

1. No. 20 copper wire at 20 cts. per lb.
2. No. 12 for shoulder caps, cost 15 cts. per lb.
3. Galvanized wire comes in coils 30" in diameter, 20 cts. per lb. Takes 87" to make an adult splint 30" long. Order 800 ft. in coils; stock for 100 splints. $1\frac{1}{4}$ lbs. = 7 ft. To cost $———.

Posterior wire splints, adult sizes, 24, 26, 28 and 30 inches, 40 cts. each, ready for use. Order 1 doz.: three 24", three 26", three 28", three 30". $4.80.

Wire shoulder caps, made, ready for use, 40 cts. Order 1 doz. $4.80.

Cubical cans for plaster in bulk.

Sheet Tin. — J. A. Murray, 201 Cambridge Street, Boston:

Each sheet is 14" x 20", and weighs $1\frac{1}{4}$ lbs 113 sheets in a case. In case quantity 13 cts. a sheet. Order a case. $14.69.

Internal angular splints. No. 4, No. 5 and No. 6 are adult sizes. No. 4, $4.00 a doz. No. 5, $4.50 a doz. No. 6, $5.00 a doz. Order six of each size, $2.00, $2.25 and $2.50. $6.75.

Rods. For application of plaster-of-Paris "Spica" bandages. — J. A. Murray, 201 Cambridge Street, Boston:

Size of rod, 5 ft. x 0 in. x $\frac{1}{4}$ in. Cost 40 cts. per pair. Order six pairs for use in ship. $2.40.

Strap Iron. — Comes in strips about 12 feet long.

$\frac{1}{32}$" x 1", 10 cts. per lb.

Order six strips. Cost (est.) $1.20.

Felt Shoulder Caps. — Seabury & Johnson, Man'f'rs, New York City. If cannot so order, can be purchased of Codman & Shurtleff, 13 and 15 Tremont Street, Boston, also Leach & Greene, 4 Park Square:

Shoulder cap No. 2 adult, catalogue price, 70 cts. apiece. 12 to be ordered. See circular. $8.40.

Special price per dozen; four days' notice required to furnish.

Splint Wood. — J. J. McNutt, 29 Wareham Street, Boston:

T-splint, 5 ft. long, 4" wide, $\frac{1}{2}$" thick, 20 cts. a set.

T-piece 18" long, 4" wide, $\frac{1}{2}$" thick. Order 50. $10.00.

James Mains, Massachusetts General Hospital: 4 ft. x 4" x $\frac{1}{4}$", $2\frac{1}{2}$ cts. apiece.

Done up in packages of a hundred. Order 400. $10.00.

Veneer wood: McNutt could not give data on account of limited time.

Adhesive Plaster. — F. E. Clapp & Co., Dedham, Mass.:

Adhesive plaster in rolls 5 yds. long, 12" wide, 90 cts. a roll.

It is intended that this be cut as required for strapping, extension, etc. This is more desirable than in 2" or 4" rolls because of price.

Order 50 rolls. $45.00.

Crinoline. — Shepard, Norwell & Co., 30 Winter St., Boston: $3\frac{1}{3}$ cts. per yd. One book, 10 yds. long by 24" = 4 complete leg bandages, 5 yds. long x 4" wide.

Order 40 books = 400 yds. at $3\frac{1}{3}$ cts. $12.80.

Plaster-of-Paris. — Curtis & Pope Lumber Co., 774 Albany Street, Boston:

In bulk $2.00 to $2.50 per bbl., according to size. To be kept on board ship in tin cans, 18" cubes. Cans to be made by J. A. Murray, 201 Cambridge Street, Boston.

Order six; cost $3.00 apiece.

Rolled bandages to be kept in cracker cans for immediate use. Order one barrel. $2.00 or $2.50.

Order six 18" cans. Order cracker cans. Order six at 50 cts.

Order covered tin pails with riveted handles for shore use. Capacity ———. Cost $1.00 apiece. Order six.

Crutches. — James Mains, Massachusetts General Hospital:

5 ft. 6" long, 6 ft. 2" long, 50 cts. each, in lots of 100.

Rubber tips, 60 cts. per doz.

These prices can be bettered by ordering of wholesale rubber dealers.

Order 50 pairs, cost 60 cts. $30.00.

Tips, $5.00 per hundred. Order 100. $5.00.

Gauze Bandage Roller. — Mr. George Alexander, carpenter at Boston City Hospital:

Apparatus costs approximately $10.00; requires one week to manufacture. Weight 15 to 20 lbs. Will roll gauze full width of piece. Is 24" wide, 40' long and 11" high. $10.00.

Leach & Greene, 4 Park Square, Boston. Tel. 1027 Tremont:

Bandage roller, plain, 60 cts. Width of bandage, $4\frac{1}{2}$". With improved wheel, width of bandage 4". Rolls run rapidly. $1.50.

Webbing. — James G. Bowden & Son, 65 Bedford Street, Boston:

50 yds. in a roll. $1.00 a roll.

Order 10 rolls. $10.00.

Buckles.—Noyes, Campbell & Co., 63 Summer Street, Boston:

$1.87 and $1.75 per box of 100 in a box; French imported. Too expensive.

L. H. Buzzell & Vail, 126 Canal Street, Boston: 50 cts. a gross. Order six gross. $3.00.

Cord.—Buzzell & Vail, 126 Canal Street, Boston: 500 ft., $3.00. Order 500 ft. $3.00.

Absorbent Waste Cotton.—F. E. Clapp & Co., Dedham, Mass.: 10 cts. per lb.; Geo. C. Gardiner, Everett, Mass.: 10 cts. per lb.

Data from Massachusetts General Hospital and City Hospital requires 7 lbs. a week for 25 patients; 100 patients need 28 lbs.; 175 patients need 49 lbs.

Order, therefore, 30 lbs., $3.00; or 50 lbs. a week, $5.00.

Sheet Cotton.—Wilson, Larrabee & Co., 27 Bedford Street, Boston:

Bale of white sheet wadding containing 40 doz. double sheets costs $8.75 less 1 per cent., $7.89.

Data from Massachusetts General Hospital and City Hospital require six to eight sheets a day for 25 patients. Therefore it will require 224 sheets for 100 patients, or 392 sheets for 175 patients. Order in bale lots on account of price.

Order one bale. $7.89.

Gauze and Cotton Bandages.—Gauze rollers for ordinary use, to be made from the cheap gauze, "Coleraine," wound with large bandage roller, and roll cut in desired width, 3″, 5″ and 8″ usually. Cotton rollers to be made from cotton cloth (unbleached), Massachusetts General Hospital, 1″, 2″ and 4″.

400 yards per week for 100 patients; 700 yards per week for 175 patients. Order in case lots of 2,500 yards to obtain benefit of price.

If all gauze rollers are used the cost would be for 100 patients, $4.00.

If all cotton rollers are used cost would be $8.00.

If half-and-half are used cost would be $6.00.

Absorbent Cotton.—Geo. C. Gardiner, Everett, Mass., presents a good cotton for 12¼ cts. per lb. 100 lb. lots. 25 lbs. $3 06.

F. E. Clapp, Dedham: 13 cts. per lb. for 100 lb. lots. $3.25.

Recommend only small amount, 25 lbs.

The Committee feel that absorbent waste should be used instead of absorbent cotton, because it is much cheaper, and is practically as good.

Gauze.—Farley, Harvey & Co., 141 Essex Street, Boston, Tel. Boston 1843:

Trade name "Coleraine" have supply now which they will sell at 1 ct. per yd. Good enough for ordinary gauze bandages.

E. P. Wilbur, 111 Kingston Street, also has some of the same gauze.

See for further information sheet on Bandages.

Gauze for dressings, "Griswoldville Mills," New York.

Wilson, Larrabee & Co., 27 Bedford Street, Boston, 2¼ cts. per yd.

Geo. C. Gardiner, Everett, Mass., 1⅞ cts. per yd.

F. E. Clapp & Co. sell to Boston City Hospital at 1¼ cts. per yd. No. 2 "Griswoldville," 100 yds. to piece in cases of 2,500 yds.

Buy direct of mills in case lots at $37.50.

Recommend 1,600 yds. for 100 patients for one week's supply; 2,800 yds. for 175 patients for one week's supply.

Oakum.—M. F. Whiton & Co., 33 Commercial Street, Boston, Tel. H. 19:

Hospital oakum, in bales of about 50 lbs., size 18″ x 24″, 7 cts. per lb. Order 2 bales. $7.00.

Safety-Pins.—Wilson, Larrabee & Co., 27 Bedford Street, Boston, either Clough or Clinton:

Clough, small size, 50 cts. a gross; large size, 65 cts. a gross less 5 per cent.

Clinton, No. 1, 43 cts. a gross; No. 3, 57 cts. a gross less 5 per cent.

Order 3 gross small size, $1.43 or $1.24.

Order 2 gross large size, $1.23 or $0.99.

Cotton Cloth.—Merchants Manf'g Co., Fall River, Mass.:

Obtain from mills direct if possible. Sold to Massachusetts General Hospital for 1 15/16 cts. per yd. in 10,000 yd. lots. Unbleached.

Quantity, 200 yds. for 100 patients per week, unless it is decided to use all gauze rollers, in which case cotton cloth would be used only for Esmarch slings. $4.00.

Esmarch Slings.—Use cotton furnished to Massachusetts General Hospital by Fall River Mills. Unbleached. 1 15/16 cts. per yd. To be made on board. One square yard cut diagonally makes two bandages. Costs per sling 1 ct.

Order 50 yards for slings only.

Needles, Thread and Pins.—Wilson, Larrabee & Co., 27 Bedford Street, Boston:

Order ½ doz. papers assorted needles, 5's to 10's; ½ doz. assorted darning needles; 1 gross pins; white cotton thread, No 40, 1 doz. spools; white linen thread, No. 36, ½ doz. spools. Estimated cost, $2.00.

Agate-ware Pails, Basins and Pus Basins.—For data see enclosed catalogue of Lalance & Grosjean M'f'g. Co., furnished by F. A. Walker & Co., Cornhill, Boston, Tel. H. 54. Discount of 40 per cent. and 10 per cent. on all agate. Agate-ware wash-basins, page 26. Pails, page 55. Pus basins, page 107. Tin hand basins and pails, page 128. Iron spoons, back of cover.

Agate-ware wash-basins, order 6	$1.29
Agate-ware pails, order 6	3.73
Agate-ware pus basins, order 3	1.62
Agate-ware spoons, $0.08, order 12	.96
Tin basins, order 12	1.22
Tin pails, order 12	2.16
	$10.97

MAXIMUM AND MINIMUM COST.

Figuring up the cost of 200 patients for a week, the Committee finds the minimum price to be about $250. They would call attention to the fact that about $175 is expended for the appliances for preparation of apparatus and after the first cost this would not enter into the running account for the succeeding weeks, except a small percentage for wear and tear.

The maximum cost for a week for 175 patients would be about $400. This amount would be for the first week only, and the Committee therefore feels that the minimum weekly cost for materials and dressings would not amount to more than $75 per week.

The Committee believes the maximum cost for 175 patients per week, after the first week, would not exceed $125 for the succeeding weeks.

The Committee finds that most of the materials can be delivered in forty-eight hours, and all of them within a week.

SECTION B. SHORE LIST.

Data furnished is based on medical and surgical reports of the Rebellion. In reviewing a number of battles, it was found that there were from 3 to 6 per cent. of men injured in every thousand engaged. The following estimate is made on a basis of 10 per cent., that is, 100 men wounded in every 1,000 engaged.

The following list is for these 100 men to be dressed once:

5 internal angular splints	$2.00
5 shoulder caps, felt	3.50
50 pieces of splint wood, 4 ft. x 4″ x ½″	1.25
5 rolls of adhesive plaster	4.50
200 plaster-of-Paris bandages, 5 yds. long, 4″ wide (estimated), carried in tin pails with riveted handles	15.00
10 lbs. absorbent cotton waste in rolls	1.00
400 yds. of gauze	8.00
6 doz. cotton sheets	
20 lbs. oakum	1.40
400 yds. gauze rollers, cut into 5″ x 12 yds.	4.00
200 Esmarch bandages	2.00
1 gross safety-pins, large size	1.23
2 papers pins Paper of needles Spool of thread	.25
Hand bag for tools	14.28
	$58.41

Hand bag for tools to contain the following articles: Pliers (round and flat), wire cutters, files (round and triangular), gimlet, small saw, draw knife with handles to fold back, magazine awl (large size, with tools in handle), hatchet (claw on back to draw nails), tape measure (5 ft.), small tin box assorted wire nails, oil stone, pencil, small package copper tacks, twine, plaster knife, 2 spools copper wire (fine and medium), scissors (2 pairs), 2 pocket knives.

$14.28 per bag, including bag.

(Signed) William M. Conant, *Chairman.*
Hayward W. Cushing.
Charles F. Painter.

LIST OF MEDICAL SUPPLIES FOR HOSPITAL SHIP "BAY STATE," WITH PROBABLE COST.

Tablets in bottles of 1,000 *each:*

Phenacetine, 5 gr.	$14.50
Potass. bromid. 5 gr.	1.00
Chlo. potass. 5 gr.	.60
Potass. iodid. 5 gr.	4.00
195,000 quinia sulph. 2 gr.	8.00
Soda bicarb. 10 gr.	.65
Sulphonal, 5 gr.	21.00
Bismuth subinl. 5 gr.	2.00
Soda mints	.75
Corrosive sublimate, 7 gr.	3.00
Saline tablets	.60
Lime water	1.00
Cascara sagrada ext. 5 m.	1.75
Soda salicylate, 5 gr.	1.60

500 *tablets each:*

Cathartic comp.	.60
Dover powder, 5 gr.	.60
Bland's pills, 5 gr.	.25
Cholera	2.25
Phenacetine and salul. 5 gr.	4.75
Pepsin pur. 3 gr.	1.60
Opium, camph. and tannin	.75

Hypodermic tablets, 100 *in bottle:*

Morph. sulph. ¼gr., with atropia.	.45
Morph. sulph. ¼ gr.	35
Strychnia sulph. 1-60 gr.	1.00
Pilocarpine hydrochlo. 1 10 gr.	1.00
Apomorphia, 1-20 gr.	.50
Schleich, local anesthetic, No. 4, strong	3.20

Tablet triturates in bottles:

1,0 0 brown mixt. oz 1	.80
1,000 calomel, 2 gr.	1 00
1,000 morphia sulph. ¼ gr.	1.50
1,000 rhinitis, ½ gr.	1.20
1,000 iron, arsenic and strych., No. 22	.60
1,000 fever and ague	1.60
1,000 lead acetate, 1 gr.	.60
1,000 paregoric, 1 odeyss	1.00
500 nitro-glycerine, 1-100 gr.	.20
500 tr. aconite root, 2 in.	.25
500 ipecac, 1 gr.	.60
500 strychnia sulph. 1-60 gr.	.20

Tablets, 100 *in bottle:*

Alum comp.	.30
Blue mass, 5 gr.	.30
Chloralamid, 5 gr.	1.00
Cocain hydrochlo. 2½ gr.	4.50

Miscellaneous drugs and furnishings:

Epsom salts, 5 lbs. in tin	.25
Castor oil in can	1.50
Sulph. naphtol, 1 bbl.	
Sandal-wood capsules, 2 doz. in box	6.00
Oxide of zinc, 3 lbs in tin	1.25
Starch, 3 lbs in tin	.50
Oxalic acid, 5 lbs. in tin	1.00
Permang. potass. 5 lbs. in lb. bots.	1.50
Corros. sublimate, 1 lb. in bot.	.75
Ether, 2 lbs. in ½ lb. tins	2.50
Chlorotorm, 20 lbs. in 1 lb. bots.	18.00
Tr. ceyssicin, 2 lbs.	1.25
Comp. sigince powder, 3 lbs. in tabs.	1.50
Tr. ginger, 2 lbs. in bot.	1.25
Carbolic acid crys. 1 lb. bot.	.75
1 oz. sulph. morphia in ⅓s	2.25
Sulph. atropia, ½ oz.	60
Ground flaxseed, 1 bbl.	4.50
Collodion, ozs. 1 doz.	2.50
Mercurial ointment, 1 lb. tin	.75
Iodoform, 1 oz.	.50
Nit silver, 1 oz.	.60
Mustard plaster, 2 oz. boxes	4.00
Soap liniment, 2 lbs.	1.50
Tr. opium, 1 lb.	2.00
Spts. ammon. aromat. 2 lbs.	2.00
Tannin, ½ lb. in tin	.75
Chloral, 1 lb.	1.75
Carb. ammonia, 1 lb.	.50
Spts. ammon. fort. 1 lb.	.25
Salicylic acid, 1 lb. in tin	1.25
Petrolatum, 5 lb. tin	1.00
Tr. iodine, 1 lb.	1.50
Alcohol, 2 gals.	5.00
Brandy, 1 gal.	5.00
Toothache plasters, 1 doz. boxes	1.75
Corn plasters, 3 doz. boxes	3.00
Corn remedy, 1 doz.	1.50
Belladonna plasters, 2 doz.	3.00
Capsicum plasters, 2 doz.	3.00
Paper pill vials, 3 gross	1.50
C. H. pencils, ass'd, 1 gross	2.00
1 oz. pres. bottles, 1 gross	1.75
2 " " " "	2.25
4 " " " "	3.50
8 " " " ½ "	2.50
16 " " " ¼ "	2.00
Cork ass'd, 5 gross	2.50
4 oz. oint. boxes, 3 doz.	
2 oz. wood oint. boxes, 3 doz.	3.00
1 " " " " "	

Assorted labels, gummed.

Round blank, shake, external	
Square " poison	2.00
Graduates, ½ doz. minim	1.00
" ½ " 1 oz.	1.25
" " " ¼ "	1.75
" ¼ " 16 "	2.00
Spatulæ, ½ doz.	1.25
Mortar and pestle	.75
H. R. funnels, ass'd	1.50
Filters	.60
Corkscrews	.50
Recipe pads	2.00
1 pr. scales	15.00
Weights	1.50
15 agate bed-pans	50.00 (?)
Medicine cases (field)	52.00
	$335.25

GEN. R. A. BLOOD,
W. L. RICHARDSON,
CHAS. A. CLOUGH.

REPORT OF SPECIAL COMMITTEE ON WATER AND ICE SUPPLY.

BOSTON, June 19, 1898.

My dear Sir: — On behalf of the Special Committee on Water and Ice Supply appointed by the Executive Committee of the Massachusetts Volunteer Aid Association, I beg to present the following report upon this portion of the fitting out of the proposed hospital ship *Bay State:*

Your Committee was apparently appointed upon June 11th, but the notification of appointment was not received until June 14th. That afternoon arrangements were made to meet with Mr. Robert M. Burnett, at the earliest possible moment, — and the Committee did meet at his office on June 15th, at noon, and in his company made a visit to the ship, inspected the space allotted for the ice and water machines, and obtained as much information upon this important matter as the time would allow.

So far as the ice machine is concerned, the Committee found that one had already been selected and ordered by Mr. Burnett, who has the specifications, at a cost of $5,700, and with a capacity of 5,000 pounds of ice in every twenty-four hours. This Committee, therefore, took no action in the matter of the ice machine.

The Committee has obtained one estimate on its own account, and two through the action of Mr. Boyd, of the Atlantic Works, of the cost of a distilling plant, and hands them to you with this report, — numbered *One, Two* and *Three*, respectively.

One. This is the estimate of the "Palatable Water Still," of 9 Bowker Street, Boston. Their offer is to furnish a distilling apparatus of a capacity of 100 gallons an hour of potable water, at a cost of $1,000, — the machine to be guaranteed perfect every way. A storage tank, of a capacity of 200 gallons, is offered for $75, this tank requiring extra room, for the reason that their apparatus will occupy all the space allotted for it in the engine-room. A pump is also needed, which is to be put in anyway, in place of the one that is already there. The engineer is to take care of the waste water from the condesing tanks, which can be easily done. The cost of installation of this plant will be extra, and no estimate was furnished.

Two. Williamson Bros. Company, corner of Richmond and York Streets, Philadelphia, submit an estimate for a distilling apparatus complete, with a capacity of 2,500 gallons of potable water in each twenty-four hours, to cost $1,075; for this there will be needed an evaporator feed duplex pump, and a distiller circulating pump extra and at additional cost. In their letter they say that the Atlantic Works can purchase these pumps as cheaply as they can themselves.

Three. M. T. Davidson, 43-53 Keap Street, Brooklyn, N. Y. (30 Oliver Street, Boston), offers an evaporator and distiller of a capacity of 2,500 gallons in twenty-four hours, including feed pump, for $1,700. If the notation on the blueprints accompanying his offer is correctly understood, this plant is too large to be placed in the space allotted to it on the ship.

The Committee recommends the purchase of either *One* or *Two*.

The supply of potable water furnished by either one of these plants is larger than could ordinarily be used by the population of the ship at its most crowded time, but the advantage of being able not to work the apparatus to its full capacity all the time is very great, so that a maximum capacity of 100 gallons an hour does not seem to be too large.

Notwithstanding the fact that the furnished water from any of these apparatuses may be fairly considered to be sterile, the Committee feel that it is of the greatest importance to provide an additional means by which some guarantee may be furnished that the actual drinking-water of the vessel may be sterile at the time it is consumed. It is, therefore, recommended that provision to this end be made by the purchase of two large Chamberland filters, which may be obtained at a cost of approximately $50 each, and which, if supplied with pressure, will furnish all necessary drinking-water freshly filtered.

This Committee also recommends that the present drinking-water tanks be arranged in a way that will permit of easy access for purposes of cleaning.

The Committee recognizes the incomplete nature of this report, and regrets that it has not been possible to do more in the time allotted to it.

It also wishes to express its willingness to give any further aid that may be in its power.

For the Committee,
HAROLD C. ERNST, *Chairman.*

To H. L. Burrell, Esq., *Secretary of Medical Committee.*

REPORT OF SPECIAL COMMITTEE ON RAILROAD TRANSPORTATION.

Boston, June 20, 1898.

Dr. H. L. Burrell:

Dear Doctor, — The Special Committee on Railroad Transportation held a meeting the 17th inst. No reply had then been received from Surgeon-General Sternberg, United States Army, in answer to letter sent him by Dr. Homans, and having no data and very little information regarding what was required of us, the meeting was informal.

Dr. Homans reported an interview with President Bliss, of the Boston & Albany Railroad, who offered his master car builder's services to the Committee, and said he would build a car according to any plans offered by the Committee, free of expense. President Bliss thought every railroad centring in Boston would do the same.

The Committee hold another meeting to-morrow morning, and it is hoped they will have a more definite report to make, and if your Committee so desire, one or more members of the Special Committee will meet your Committee later in the day, and give an account of their stewardships.

Very respectfully,
For the Committee, M. E. Webb,
Secretary Special Committee.

Boston, June 20, 1898.

Dr. Herbert L. Burrell,
Secretary Medical Committee,
Massachusetts Volunteer Aid Association:

My dear Doctor, — Your Special Committee have carefully considered the question of railway transportation, and have studied the articles referred to by Surgeon-General Sternberg, United States Army, in his letter of June 16th to Dr. Homans.

We conclude that all transportation of invalid soldiers must necessarily be under the control of the surgical departments of the army and navy, but no distinction would be made between soldiers from different States, and their transportation and destination would be controlled by the army and navy officials.

The only important recommendation that we now make is that the hospital transfer ship *Marmion* shall always have on hand two or three extra complete sets of cots and fittings, which can readily and quickly be put in place on cars by carpenters at any port at which steamer may arrive.

We hold ourselves ready to perform any further service which may be required of us.

Very respectfully yours,
JOHN HOMANS, *Chairman.*

(Signed) M. E. Webb, *Secretary,*

REPORT OF COMMITTEE ON EQUIPMENT.

Boston, Mass., June 18, 1898.

To Executive Committee
Massachusetts Volunteer Aid Association:

Gentlemen, — The Committee on Equipment presents the following preliminary report: It is desired to equip the forward deck for the reception of fifty patients, and the same number in the after deck, this to be arranged for in iron stands, to be so made as to be taken apart and cleansed, so that if the number of patients were less a small number of stands would be needed.

The patients should lie upon mattresses supported on gas-pipe frame covered with canvas, slung to the stand, as indicated in the accompanying diagram. There should be wheel-tracks for moving patients.

There should be one service table in each ward, made of iron piping covered with sheet iron. This table should be securely fixed to the floor, and should be provided with racks, and arrangements for the securing of plates, knives and forks, as well as cups and pitchers. It is suggested that the service be either aluminum or agate-ware. There should be approximately for each ward two large soup kettles, a dozen pitchers, two dozen large platters, fifty cups, half a dozen water pitchers, all of non-breakable material. There should be fixed ward stands, or lockers for medicine, and for securing of ice bags, hot-water bags, medicine, paper (Japanese) and rubber, medical and surgical solutions. These should be of iron with iron slats. There should be a sink, water-closet, slop-hopper and waste chute in each ward, with arrangements for the securing in slats or crate of half a dozen urinals, a dozen bed-pans made of granite ware or paper, paper sputum cups, paper bowls and agate-ware feeders. The sinks should be partitioned off from the ward by removable iron screens. There should be one large water tank in each ward, containing ice, and with proper jackets to preserve the cool water. There should be facilities for heating water and boiling water in the ward, and arrangements for lifting the patients to the upper deck, similar to a sidewalk elevator, large enough to carry a frame. There should be an iron truck in each ward, and a folding portable bath. There should be hot-water faucets, and an arrangement in the wards for keeping linen, towels, pillow cases needed for immediate use. These should be kept in open linen lockers with iron grating or netting in front.

The greater part of the linen, extra mattresses, clothing, etc., should be stored in a proper storage place below, which should also be furnished with hooks for hammocks, to be slung in case of an unusual number of convalescent patients.

The disposition of the hold cannot be determined upon until a Committee on the Freezing Apparatus has reported. The hold, however, should be made to contain a small clinical laboratory, an arrangement for operating with the necessary sterilization outfit and for medical stores.

The accommodation for the medical officers and nurses of the vessel cannot be definitely determined until it is decided where the water-still and refrigerating apparatus are to be placed. The arrangement should provide for the accommodation of at least three medical officers and two petty medical officers, for the accommodation of two head nurses and four assistant female nurses, as well as four male nurses, and should provide for two bath-rooms, for the use of the medical officers, male and female, including water-closets.

The dining accommodation should be sufficient for the service of thirty individuals, of which six will be females, and should provide for the serving of two tables similar to the first and second class on an ocean steamer. The arrangement of a new galley with communication between the galley and the wards, that is, by means of chutes or dumb waiter, is recommended. The galley should be sufficient to cook for one hundred and fifty people.

The communication between the promenade deck and the wards should be by ladder and lift for patients, or by a staircase, if the lift is not such as can be readily slung, and used for the female nurses. It is recommended that the upper deck be furnished with a wooden covering, which is cheaper than canvas, and more serviceable, canvas awning being used along the sides, where wooden awnings would not be easily placed, or impracticable.

Toilet Articles. — Brush and comb, tooth brush. One set for each patient, to be of uniform size. Number required, 500.

Care of. — By having a pocket made in the following manner: The canvas which is to support the mattress might have an extra piece 18 x 12 inches which would hang over the side of the iron support. In this could be made a slip

for each article, and another pocket if needed. Inasmuch as the canvas supports have to be manufactured, this method could be easily employed. Number required the same as the number of beds, and an extra supply for each strip, 500 in all, brushes, combs, tooth brushes, face cloths, towels, soap.

CARE OF THE PATIENTS' CLOTHING WHEN RECEIVED.

The most effective way seems to be to place the clothing in a bag. In this way it can be disinfected without being separated.

Bag. — Those used in the navy are 14 inches in diameter and 3 feet deep. They are made of Bag Canvas No. 4. On the bottom of each bag is to be a painted number, which is to be recorded for the patient when his clothes are received. When the bag has been disinfected, it can be deposited on a rack compartment in the hold with end and number in view. Number required, 500.

CLOTHING FOR THE PATIENTS WHILE ON THE SHIP.

Of these there are two classes:

Class 1. All patients to have bed gowns, these to consist of a cotton nightdress. Number required, 500.

Class 2. This class to consist of those patients who are convalescent and can be up during the day. The clothing required will be for those whose clothes are unfit for use.

Under Clothing. — Shirts and drawers. The cheapest and most efficient would probably be imitation Balbriggan. Number required, 500.

Stockings. — Cotton. Number, 500.

Slippers. — For convalescing patients. The most serviceable which could be disinfected would be carpet or canvas slippers. Number required, 500.

Outer Clothing. — A cool serviceable cheap suit could be made out of light-weight brown or white cotton or duck or crash. The Government was able to supply suits of this kind to the army for about $2.00 each. A hospital ship's clothing would require less trimming, and would be cheaper.

Hats. — Canvas hats, such as are used in the navy. Number required, 500.

REPORT OF THE FEEDING UTENSILS NECESSARY FOR THE SERVING TABLE OF THE WARDS.

Name of utensil.	Size or cat. number	Price per. doz.	No. required for forward ward.	No. for after ward.	Total cost.
Flat bottom dinner plates	108	$2.50	84	70	$32.00
Soup bowls	125	2.75	84	70	35.20
Cups	5	2.50	84	70	32.00
Wash basins	28	3.75	43	36	24.67
Ice bowls	1	9.00	12	12	18.00
Soup ladle	38	2.50	2	2	.84
Sugar bowl	402	12.00	1	1	2.00
Total with a discount of 40%, 10% more on some articles					$86.83
Salt and pepper sprinklers			2	2	
Butter holder		$5.00	1	1	10.00
Bread cutter		.50	1	1	1.00
Knives and forks			84	70	30.00
Teaspoons			84	70	10.00
Soup spoons			84	70	16.00
Carving knife and fork		1.00	1	1	2.00
Food carriers		6 50	3	3	9.00
5 gal. tea or coffee can		6.00	1	1	12.00
5 gal. milk can		6.00	1	1	12.00
			Total,		$189.83

These utensils, having catalogue numbers, are pearl-agate ware, manufactured by Lalance & Grosjean Manufacturing Co., 87 North Street, Boston.

Each ward can have its own color, for there are three colors used in the manufacturing of the pearl-agate ware. In ordering this ware, one week's notice will be required by the manufacturers.

The uncatalogued articles may be obtained from Smith & Anthony, 45–54 Union Street, Boston. The prices of these articles are necessarily only approximate, because it is not known definitely the quality and sizes required.

BOSTON, June 18, 1898.

DR. H. L. BURRELL,
Secretary Medical Committee,
22 Newbury Street, Boston:

My dear Doctor, — According to present estimates, the size of the sheets is 7 feet 8 inches by 3 feet 6 inches. Seventeen inches by 24 inches for the size of the pillows will answer, if as readily made up by the pillow-maker as the estimated size, 18 inches by 24 inches, but there is a certain disadvantage in the manufacture of an odd number (17) over a divisible number (18).

Yours very truly,

E. H. BRADFORD,
For the Committee.

REPORT OF COMMITTEE ON FOOD SUPPLIES.

BOSTON, June 20, 1898.

DR. H. L. BURRELL,
Secretary of the Medical Committee,
Massachusetts Volunteer Aid Association:

My dear Sir, — I beg leave to offer, on behalf of Dr. Rowe and myself, as it has not been practicable to have a meeting of the full Committee, the following provisional report:

(1) We recommend the diet table of the United States Navy hospitals, a copy of which is enclosed, with such modifications as are demanded by the climate, for all on board, with certain additions in the way of variety for the officers' table.

Estimates of quantities may be made up from this diet table and that of the army in garrison for a full line of supplies. Such a sheet is enclosed, which is partially filled out. Further information as to the requirements and limitations of the climate is needed before it can be completed.

(2) The cost of stocking the ship for one month with food supplies for 218 persons will be from $1,500 to $2,000, and the expense of keeping up the stock will be about $1,000 per month.

(3) As to the specifications, the Committee ask for further time. They also ask for a statement of the exact number of cubic feet to be placed at their disposal for storage, and if it is contemplated to stock the ship with the full line of fresh meats.

Respectfully submitted,

ELLEN H. RICHARDS,
For the Committee on Food Supplies.

PROVISIONAL ESTIMATES FOR THE MASSACHUSETTS HOSPITAL SHIP.

100 men, 30 days. Essential for all.

	ARMY RATION IN GARRISON.	NAVY HOSPITAL RATION.	ESTIMATED.
Apples (evaporated)	124 lbs.		125
Bacon	186		50
Barley	4		25
Beef, poultry, etc.	3,420	2,922	
Beef (dried)			
Beans (dried)	291	109	
Beans, Lima			
Butter	40	375	366
Corn meal	58	90	
Cheese	7	25	
Codfish			
Cocoa			
Coffee	300	187	240
Crackers			
Eggs			
Flour	2,979	1,500	1,960
Ham	22		
Hardtack			
Lard	73		
Maccaroni	36	56	50
Milk (fresh)	21	1,125	
Milk (condensed)	21		
Oatmeal	30	93	½ bbl. rolled oats.
Onions	470		
Peas (dried)	3		
Potatoes	3,480	1,875	
Pickles	4 gals.	186	2 gals.
Limes			2 gals.
Pork	244	25	25
Prunes	25		25
Raisins	10		10
Rice	18		½ bbl.
Salt (table salt)			
Salt (rock salt)	87		
Molasses (syrup)	112		10 gals.
Sugar	497	375	
Tomatoes			
Tapioca	25		25
Tea	5.4	47	45
Turnips (white, French)			
Vinegar	14 gals.		
Cabbage			

PROVISIONAL ESTIMATES FOR THE MASSACHUSETTS HOSPITAL SHIP.

25 men, 30 days. Officers' mess.

EXTRAS AND CONDIMENTS.

Apricots (canned), apples (canned), beef (canned), beef (dried), beef (pickled tongue), baking powder, 20 lbs.; beans (canned string), cerealine, cinnamon (ground), cinnamon (stick), corn (canned), cornstarch, chicken (canned), chocolate, cocoanut (desiccated), cream tartar, flavoring extracts, farina, fruit: lemons, oranges, bananas, pineapples; ginger, Leibig's extract, Mellin's food, malted milk, mustard, olive oil, peas (canned), pepper, raspberry jam, squash, sardines, shrimp (canned), soda, vermicelli.

REPORT OF SPECIAL COMMITTEE ON YELLOW FEVER.

Boston, June 19, 1898.

Dr. Herbert L. Burrell:

Dear Sir, — The Special Committee on Yellow Fever for the Massachusetts Volunteer Aid Association has the honor to make a preliminary report on the requirements for fitting up the hospital ship in order to be able to treat properly such cases of yellow fever as the Surgeon-General of the Navy thinks may be expected.

The Committee will report later on the means of recognizing yellow fever, and also on the methods of treatment which will not involve any expense or medicines, etc., not needed for the treatment of other infectious diseases.

As regards isolation, disinfection and prophylaxis, yellow fever may be treated in the same isolation ward with typhoid fever, cholera and dysentery; and of these four diseases there will probably be more cases of dysentery than of the other three diseases together.

A sufficient steam-disinfecting plant for the four diseases will probably cost not far from $500; and this can be used also for the eruptive diseases, if any occur.

An abundance of chloride of lime, carbolic acid, corrosive sublimate and formaldehyde-solution will be needed for typhoid fever, cholera and dysentery, as well as for yellow fever, and the same free use of clean sheets, pillow cases, etc., will also be indicated.

Respectfully submitted,

(Signed) C. F. Folsom,
S. H. Durgin,
J. H. Wright.

REPORT OF COMMITTEE ON DYSENTERY.

Boston, June 18, 1898.

Dr. H. L. Burrell,
Secretary of the Medical Committee,
Massachusetts Volunteer Aid Association:

Dear Sir, — The Committee on Dysentery has the honor to submit the following report:

ACUTE DYSENTERY.

(*A*) *Diagnosis.* — On this head little need be said. The presence of blood and mucus in the intestinal discharges, with or without tenesmus, tormina and constitutional disturbance, is sufficiently diagnostic for practical purposes.

(*B*) *Treatment.* — (1) Prophylaxis.

(*a*) Boil all drinking-water or water used for washing cups, plates, spoons, etc., unless it has been condensed or distilled aboard ship.

(*b*) It seems unnecessary to dwell on the importance of abstention on the part of the sick in the presence of dysentery from over-ripe or unripe fruits, or improperly cooked vegetables and the like.

(*c*) The constant wearing of a woollen belly-band is advisable.

(*d*) Stools. — On a vessel in salt water the disinfection of the stools is of less consequence than their prompt and thorough discharge from the ship into the sea.

A soiled bed-pan should be washed thoroughly with a stream of (salt) water and then immersed for five minutes at least in a solution of corrosive 1 to 5000 before drying and using again.

(*e*) Linen soiled with dysenteric (or typhoid) dejections should be soaked in carbolic solution 1 to 40 or corrosive 1 to 5000 for four hours at least and then boiled for ten minutes. After this they can safely be laundered with other linen. If soiled linen can be boiled immediately after removal from the bed the disinfectant is not necessary.

(*f*) Protect mattresses as far as may be with rubber sheets, said rubber sheets whenever soiled to be washed with the above carbolic or corrosive solutions and, if possible, exposed to the sun and air.

(*g*) A soiled mattress should be treated with superheated steam or destroyed.

(*h*) Oakum pads may be used under patients with involuntary or incessant discharges; the pads can be burnt in the furnace or thrown overboard.

(*i*) The nates should be cleansed with paper and then with compress wet with carbolic 1 to 40.

(2) Of the Case.

(*a*) *Rest.* — The sooner after symptoms appear rest and an even temperature (bed) can be secured the better.

(*b*) *Diet.* — The less residue, or, at least, irritating residue, there remains to pass over the inflamed surface the better. Hence milk (condensed), broths, strained fluids, egg albumin and strained chowder are desirable. It is recommended that a considerable supply of Wyeth's Beef Juice be provided, keeping it near ice in a warm climate. In our judgment, this preparation stands on a different plane from the ordinary beef extracts.

(*c*) Alcoholic stimulants should not be used in any routine manner, but only as symptoms in the given case demand.

(*d*) Medicinal.

When the case first comes under observation, if there is the least doubt as to the emptiness of the colon, castor oil, calomel or epsom salts should be given, either alone or in combination. The bowels should then be kept open, usually preferably by salines, opium being given as freely as pain and tenesmus seem to demand. Opium should not be given for the purpose of locking the bowels nor should it be allowed so to act.

Irrigation of the lower bowel with water or salt solution may often be used with advantage.

Your Committee has not sufficient personal experience with the ipecac treatment of tropical dysentery to warrant either endorsement or condemnation thereof.

In chronic cases and in convalescence a more liberal dietary is advisable, and if the disease seems likely to run a chronic course patients should be sent North as soon as possible.

AMEBIC DYSENTERY.

Diagnosis. — This is only to be made with certainty by microscopic examination of the fresh stool and the demonstrations of the amebæ in active motion.

Prophylaxis. — The same as for the commoner forms of dysentery.

Treatment. — In addition to symptomatic measures the large intestine should be flushed daily as far as may be with a warm solution of quinine 1 to 1000.

Amebic abscess of the liver is to be treated by incision and drainage.

Respectfully submitted,

Frederick C. Shattuck,
C. F. Withington,
W. T. Councilman.

REPORT OF SUB-COMMITTEE ON TYPHOID FEVER.

Boston, June 17, 1898.

H. L. Burrell, M.D., Secretary:

Dear Sir, — In reference to your request for suggestions regarding the management of typhoid fever on the hospital ship *Marmion* of the Massachusetts Volunteer Aid Association your Committee beg to report as follows:

With reference to diagnosis the Widal test would doubtless prove of much service, and we should expect that the clinical laboratory would offer proper facilities for its application.

It seems to us that with regard to treatment the two points which it is perhaps alone worth while that we should emphasize are:

(1) The best possible provision for the free use of cold water, internally and externally.

With reference to the external use of cold water we may mention the wet pack, the sponge bath and the full bath. For the full bath the portable rubber bath-tub devised by Dr. C. W. Townsend, of Boston, may often be found available when the movable tub cannot be used.

(2) The treatment of the excreta, bed linen, etc.

There will undoubtedly be times when it will seem to those in charge simple, safe and expeditious to throw overboard the excreta (the stools and the urine). At other times this

summary method of dealing with these products of the disease may not be considered prudent.

Under those circumstances, we recommend the treatment of the stools and urine with chloride of lime, a strength of to 130. In either case the utensils should be washed and disinfected. Bed-pans should be provided with rubber covers, and there should be an ample provision of rubber sheeting for use on the beds, *when necessary*.

All linen and bedding in use in connection with typhoid fever patients should be thoroughly sprinkled with a solution of carbolic acid 1 to 40, enveloped, before transport, in sheeting and then thoroughly boiled in water.

Table utensils should not be used in common by typhoid fever patients and other people, or if so used should be thoroughly washed in boiling water.

Attendants should be warned that the poison of typhoid fever exists in the discharges, and that this poison is usually transferred from the hands to the mouth. The hands, therefore, should either be kept clean or be kept away from the mouth.

George B. Shattuck,
Elbridge B. Cutler,
Richard C. Cabot.

REPORT OF SPECIAL COMMITTEE ON DIAGNOSIS AND TREATMENT OF CHOLERA.

Herbert L. Burrell, M.D.,
Chairman of Executive Committee:

Dear Sir, — The Special Committee on Diagnosis and Treatment of Cholera begs to report briefly that the diagnosis is mainly one of suspicion until the comma bacillus is recognized.

The method of complete diagnosis, however, will be as necessary in several of the other diseases which may be encountered on board the steamer *Marmion* as with cholera. A well fitted and managed isolation ward will be necessary, and it may safely be used for cases of cholera, dysentery, yellow fever and typhoid fever.

The infective principle in these four diseases resides chiefly in the excretions and, therefore, the most absolute cleanliness and disinfection must be secured to prevent the spread of any one of these diseases. This applies especially to the hands and body of the patient, hands of the nurse, the floor and bed clothes, the latter needing to be changed as often as they are soiled.

A steam disinfecting plant of moderate size is recommended and also a good supply of forty-per-cent. solution of formalin, chloride of lime, corrosive sublimate and carbolic acid. A large supply of bed linen and shirts will be necessary. The treatment otherwise is not likely to be of any specific character and may, if necessary, be made the subject of subsequent suggestions.

The cost of the steam plant would probably be below five hundred dollars and the outfit of microscope, incubator, stains, etc., for the diagnoses in the several diseases, would very likely be under four hundred dollars.

Very respectfully,
Samuel H. Durgin,
Samuel W. Abbott.

REPORT OF COMMITTEE ON THE DIAGNOSIS AND TREATMENT OF SMALL-POX.

Boston, June 20, 1898.

Dr. H. L. Burrell,
Secretary of the Medical Committee,
Massachusetts Volunteer Aid Association:

Dear Sir, — We herewith transmit our report on the diagnosis and treatment of small-pox.

Measles, varicella, syphilitic eruptions and an eruption due to the iodide of potash have all of them been mistaken for small-pox, and *vice versa*, by practitioners of experience. It is important, therefore, to carefully examine the patient, particular attention being paid to the appearance of the mucous membrane of the mouth and the parts of the body generally covered by the clothing, for in these situations the eruption assumes a more typical form. In measles the diagnosis is generally sufficiently easy, except in the dark-skinned races. In measles the cough, the suffusion of the eyes and the appearance of the roof of the mouth are sure guides to a correct diagnosis. In a severe case of measles it sometimes happens that the papular stage is quite long, and there is a certain amount of hardness around the papules simulating the shotty feeling of small-pox. If the papules, however, are carefully examined, they will be found to be regular in form and do not present at the apex a minute vesicle, whereas in a case of small-pox minute vesicles can be seen at the apices of the papules. These vesicles are so small that they are very likely to escape detection, unless the examination is very carefully made in a good light. In the differential diagnosis of these two diseases the temperature is often of great assistance. In measles there is a rise in temperature at the commencement of the attack, and it does not fall on the appearance of the eruption, but remains elevated until the eruption commences to fade. In small-pox, on the other hand, even of the severest type, there is a sudden drop in the temperature coincident with the appearance of the eruption. The general condition of the patient at this time seems to improve, the headache and the pain in the back disappear. It is important, therefore, that an eruption appearing coincident with a fall of temperature should be most carefully scrutinized.

The diagnosis of a severe attack of variola in an unvaccinated person presents difficulties only in the first twenty-four hours of the eruption. A mild case of varicella in a child with a thin and delicate skin is very easily recognized. It is stated by some of the authorities that varicella is an infantile disease, and that it is neither preceded by nor attended with any marked constitutional disturbance. The truth of this statement does not bear the test of experience. An attack of modified small-pox is a comparatively trivial affair, so far as the physical suffering of the individual who has the disease is concerned, but it may be a serious matter to all unvaccinated persons with whom he may come in contact. Because of the mild character of the disease, the difficulty of a correct diagnosis is very much increased. The term varioloid, too, is calculated to do much harm not only among the laity, but also among physicians. The word should be dropped from the nomenclature and the term "modified small-pox" substituted. This disease is not like variola, as the word varioloid signifies, but it is variola of a mild type and modified by vaccination.

In common with all acute diseases, a case of modified or unmodified small-pox always commences with a greater or less amount of constitutional disturbance, but frequently in the modified form this is so slight as not to attract the attention of the patient. The same can be said of varicella, although, as a rule, the prodromic stage is shorter. The headache, pain in the back, chills and fever are nearly the same in each of these diseases, differing only in severity and duration. In young children convulsions may be present, although this is not common in varicella, but is quite common in variola. As there is nothing characteristic in the prodromata of these diseases, it is a self-evident fact that a diagnosis cannot be made before the appearance of the eruption. It is claimed by some observers that the pain in the back in variola is so peculiar in its nature and situation that the disease can be detected by this symptom alone. This, however, is purely fanciful, and is of no practical use. In regard to the situation of the eruption, there is no marked difference between the diseases. The fauces, the genitals, the palmar surface of the hands and the plantar surface of the feet are attacked alike in each disease, although the throat, the palms and the soles are not invaded so frequently or to such an extent in varicella as in variola. As there is nothing characteristic in the constitutional disturbance, as there is no marked difference in the parts of the body invaded, the only sure guide to a correct diagnosis is the appearance of the eruption and its sensation to the touch. In varicella the papular stage is very short, and it is very rarely the case that this stage is seen; but that there is a distinctly papular stage there can be no doubt. In a person with a thick, dry skin this papular stage frequently gives rise to an error in diagnosis. The vesicles in varicella are not full and round as in variola, but frequently have a shrivelled appearance, rupture easily, and, when ruptured, empty themselves completely. The base of the vesicle, after rupture, frequently transudes a very little bloody serum. There is no induration, as a rule, about a typical vesicle of varicella, but in a thick-skinned individual a certain amount of thickening, resembling induration, may be found. Great variation in the size of the vesicle is also a marked characteristic of varicella in distinction from variola. When the eruption begins to dry, this process commences in the centre of the vesicle and causes an appearance which somewhat resembles umbilication, but which is entirely different from the umbilication of the small-pox vesicle. The

appearance and course of the eruption in the palms and on the soles is very different in the two diseases. In varicella the vesicles disappear by the process of absorption or by rupture, while in variola hard, firm disks are formed, which are very gradually removed by disintegration of the integument covering them.

In variola the papular stage is much more marked and of much longer duration than in varicella, lasting from one to three days. At the end of this time a small vesicle, with a minute central depression, appears at the apex of the papule. This central depression or umbilication is pathognomonic of the disease and is never absent. The vesicles now increase in size, are quite firm, filled with a milky fluid, are extremely difficult to rupture, when broken do not empty themselves completely, and are surrounded by a certain amount of induration. At the end of the fourth or fifth day the vesicles are globular in shape, and have lost the umbilicated appearance, because the pressure of the fluid in them has ruptured the tissue which bound down the centre. The next stage is the pustular, which is ended by rupture of the pustule and the formation of a yellow crust, surrounded by a wall of induration, entirely different in appearance from the black crusts seen in varicella. In small-pox modified by vaccination a portion of the eruption frequently aborts, that is to say, it does not pass beyond the papular stage, but disappears by absorption.

In a syphilitic eruption the absence of any vesicles in the mucous membrane of the mouth and the scaly appearance of certain portions of the eruption will aid in diagnosis. The palmar surface of the hands and the plantar surface of the feet, although frequently presenting a fissured and scaly appearance, do not have the hard, firm disks seen in small-pox. In small-pox, as a rule, the eruption is in very nearly the same stage all over the body, either papules, vesicles or pustules, whereas in a syphilitic eruption there may be all the stages in the same individual at the same time.

Eruptions due to iodide of potash have been mistaken for small-pox, but a careful examination shows that this eruption is a pustule on quite a large inflamed base. No vesicles can be detected. There is no eruption in the mucous membrane of the mouth.

Prophylaxis, Vaccination. — Vaccination, however, should be properly performed in order to prevent attacks of cellulitis. Glycerated calf lymph put up in capillary tubes should be used. The arm should be thoroughly sterilized with a solution of corrosive sublimate, one part to a thousand. Three small scarifications should be made, preferably with a sterilized needle. These scarifications should not be deep enough to draw blood, but sufficiently deep to cause a little serum to exude from the denuded surface. The lymph should then be carefully rubbed in and the vaccinated place covered with a cocoon of sterilized cotton. If this is done in every case, attacks of cellulitis, which so commonly follow vaccination, will be avoided.

It is very important that there should be a place for isolation of cases of small-pox, and we would suggest that a place on the ship *Bay State* be set apart for this purpose. While the isolation would be not ideal, yet it will accomplish much good if a case of the disease should break out on board. A source of danger will be the transmission of the disease by the attendants, but this can be reduced to a minimum by careful attention to detail.

In regard to the treatment of small-pox very little can be said. Alcoholic stimulation must be freely administered and a certain amount of opium may be given. It must be borne in mind that small-pox is a very debilitating disease, and that the vital forces of the patient must be supported in every possible way. Various applications to the face have been devised, but these are of doubtful advantage. A weak solution of carbolic acid in olive oil relieves the itching of the face to a certain extent, and thereby contributes to the relief of the patient.

Respectfully submitted,

JOHN H. McCOLLOM.
THOMAS B. SHEA.

REPORT OF THE COMMITTEE ON OPHTHALMIC DISEASES.

Gonorrheal conjunctivitis is an infectious disease caused by inoculation with the gonococcus. The time of incubation varies from a few hours to two or three days according to the virulence of the infectious material.

The first symptoms are swelling and usually redness of the lids, with sensation of burning and sensitiveness to touch. Accompanying or rapidly following these there are congestion and swelling of the conjunctiva, not only of the lids and fold, but also of the globe. The swelling of the lids may soon be so great and tense as to make it difficult, even for the surgeon, to open the eye. The conjunctiva becomes a vivid red; over the lids and in the fold its surface is uneven, on the globe it is smoother. The density of the conjunctival swelling varies. At the edge of the cornea it generally rises in a sharp ridge, or may overlap. There is often some fever. The preauricular gland may be enlarged. The secretion, at first watery, often slightly tinged with blood, becomes flocculent and finally frankly purulent. As the secretion assumes the purulent character the swelling and rigidity of the lid usually lessen. The swelling of the lids may increase for two or three days and as long a time again elapse before the purulent secretion is established. In the course of four to six weeks the secretion gradually grows less and the conjunctiva in some cases returns to its normal condition, but a state of chronic congestion and thickening generally lasts much longer.

A condition of importance that occasionally occurs is one which presents the clinical picture of diphtheritic conjunctivitis. Portions of the conjunctiva appear gray instead of red, and a thin membrane is here seen which is in intimate connection with the tissues beneath. For two reasons is this condition of importance: it demands a modification of the treatment; it places the cornea in especial danger.

Implication of the cornea is the chief danger to be feared in the disease. This may appear as infiltration and ulceration near the corneal edge, perhaps under the overlapping fold of conjunctiva, or there may be a diffuse haziness with several foci of denser infiltration. Other things being equal, the earlier it appears the greater the damage it is likely to cause.

In the treatment throughout cleanliness is of the utmost importance. The lids should be opened and the eye washed out every hour by a gentle stream of 3-per-cent. boracic-acid solution, or 1 to 10,000 mercuric bichloride. Flocculent masses that cling to the lid angles should be removed by bits of cotton or linen, care being taken not to touch the cornea. After each washing the lids should be anointed with vaseline to prevent excoriation. In the earlier stages and until purulent secretion is established cold is the most effective agent. This can probably be most conveniently and efficiently applied in the form of a bit of ice, the size of the last joint of the thumb, wrapped in a layer of absorbent cotton. It should be maintained continuously.

When the secretion has become purulent and the conjunctiva loose and succulent, cold is to be omitted. The lids should now be daily everted and painted with 4-per-cent. solution of protargol, the excess being washed off with water. Silver nitrate, in 2-per-cent. solution, may be used instead of protargol, but in such case greater care must be taken that the excess be thoroughly washed off and that the solution does not come in contact with the cornea. The advantages of protargol are that it does not have the deleterious effect on the cornea that silver nitrate has, and that it causes much less pain, while it is quite as efficient as the latter.

But neither protargol nor silver nitrate is to be employed if any of the gray patches in the conjunctiva resembling those found in diphtheritic conjunctivitis are present. So long as these exist the treatment must be limited to cleanliness and the moderate application of cold, or, if they be extensive, to intermittent warm applications.

Complications on the part of the cornea do not counterindicate the use of protargol or silver nitrate, although they call for still greater care lest the latter come in contact with the cornea. But a drop of $\frac{1}{2}$ to 1 per cent. solution of atropine sulphate should be applied often enough to ensure moderate dilatation of the pupil, usually once or twice a day. Cocaine, on account of its tendency to produce dryness of the surface of the cornea, is better avoided.

Where there is no longer any purulent secretion and the conjunctiva has ceased to be abnormally succulent, protargol may be omitted and $\frac{1}{4}$-per-cent. solution of zinc sulphate dropped into the eye thrice daily. The frequent washing with boracic-acid solution should be continued until the conjunctiva has returned to its normal condition.

The infectious character of the disease calls for strenuous precautions in two directions: as regards the other eye of the patient, since one eye only is usually attacked at first; as regards other individuals. Direct contact of the secretions may be assumed as necessary to carry the infection. Besides ordinary measures to avoid this, the second eye may be protected by some form of shield, as useful a method as any being perhaps the adjustment of a watch glass in front of the

eye by means of adhesive plaster so as to hermetically seal it. To prevent infection of others, all materials coming in contact with the eye or its secretions should be immediately disinfected or destroyed, and the hands of the attendant disinfected. Naturally the camel's hair brushes used for painting the conjunctiva should never be employed in another case.

O. F. Wadsworth,
Myles Standish.

REPORT OF COMMITTEE ON A SYSTEM OF RECORDS.

Boston, June 20, 1898.

Dr. H. L. Burrell:

Dear Sir, — The Special Committee on a System of Records, appointed by the Executive Committee of the Massachusetts Volunteer Aid Association, respectfully presents the following preliminary report.

We have corresponded with and conversed with army and navy officials, both active and retired; and with persons competent to supply suitable material. As a result of these investigations, it seems desirable to make the Medical Records as simple as possible, and to preserve these in the card catalogue form. Their chief value seems likely to lie in their use as a means of identification and of facilitating the work of the Pension Office.

Your Committee would, therefore, suggest that a zinc frame, properly bent, should be attached by a hook to each bed. In this frame is to be inserted a card, 5 x 8 inches, on which the necessary data are to be written in spaces properly indicated. A sample of the necessary printing and spacing is herewith submitted:

Sample "A."

HOSPITAL SHIP "MARMION."

Name Date
Age Native of No. Bed No.
Grade
Address
Address nearest friend
Received from
Disability
How and when received
Discharge { Date / Condition / Delivered to
Medical Record

Surgeon in Charge.

The texture and color as shown in Sample B.

In addition, a card of like size and color, stamped with charts for temperature, pulse and respiration is also desirable. These two sets of cards are to be permanently preserved in an oak case, a drawing of which is herewith submitted.

Furthermore, your Committee recommend that each patient on his discharge from the hospital ship be provided with a card which shall contain the information detailed on Sample B, — which is of the size, shape and texture considered desirable:

Sample "B."

HOSPITAL SHIP "MARMION."

Name No
Grade
Address
Address nearest friend
Date of discharge

Surgeon in Charge.

The Surgeon-General of the Navy suggests that it would probably facilitate the work of the Pension Office if the discharged patient should be provided with a more or less complete copy of the record card, in which case a double number of such cards would be necessary, and the small cards dispensed with. The additional cost would be about $20.

The Library Bureau, of 530 Atlantic Avenue, has agreed to furnish the following:

250 zinc frames for	$20.00
5,000 5 x 8 in. cards, printed, ruled and spaced	37.75
5,000 discharge cards, printed, ruled and spaced	17.50
Oak cabinet for cards, (5,000)	31.00
5,000 temperature records, (Furnished by Leach and Green)	35.00
Total	$141.25

Yours respectfully,

John Dane, *Secretary.*

REPORT OF COMMITTEE ON ACCOUNTS OF THE DISTRIBUTION OF SUPPLIES.

Boston, June 18, 1898.

Dr. H. L. Burrell,
Secretary of the Medical Committee,
Massachusetts Volunteer Aid Association:

Dear Sir, — The Committee on Accounts of the Distribution of Supplies on board the hospital ship *Bay State* begs to submit the following report.

For the purposes of the present report, it is assumed that the purser or paymaster is the financial officer of the vessel, and is to be responsible for all supplies when the vessel is fitted out, and for such purchases as may be made later, and this is recommended.

The system of accounts should be as follows:

(1) The principal books should be a journal and ledger, in which all accounts should be properly footed and trial balances made at suitable periods.

(2) Subsidiary account books, really day books, in which should be entered daily the items relating to the various series of accounts. These may be kept according to the convenience of the purser, but we should suggest provisionally separate books, — apothecary's supplies, provisions, clothing.

(*a*) An account of the stock on hand when the ship is ready for sea, and of any stock which may hereafter be purchased or otherwise acquired should be kept by the purser in one or more books, known as inventory or stock books. Provisionally, we suggest that three such books be kept.

In addition to the above-mentioned ledger, journal, day books and inventory books, the purser should have at his disposal a check book, if he is to be required to draw checks, and a pay-roll book, also a copy book with proper press, and sundry memorandum or miscellaneous books to be used at the discretion of said purser.

(*b*) In accounting for the distribution of supplies, we advise, in the first place, that requisition papers on the purser be used by all persons who receive any supplies from this department. Secondly, that a system of vouchers be prepared, which vouchers shall themselves serve as receipts for the goods.

Specimens of said requisition papers and vouchers are herewith annexed. (Appendix A.)

(*c*) The same system serves equally, whether the requisitions and vouchers are presented by persons on board the ship, or by other persons on detached service of any kind. Blank receipts should be also kept on hand.

We have annexed to this report (Appendix B) a full list of such books, printed blanks and all other articles required by the purser for the proper performance of his duties, with prices for the same, and firm from which they can be obtained. As the time (five days) given this Committee to report was too short to admit of any bids or active form of competition, the ordinary market prices alone are quoted. It is recommended that a safe be provided for the purser. Purser's stateroom should be large enough to have desk, small safe and press copying machine, which could be placed on top of safe. His principal books can be stored in safe. No other special arrangement for the storage of books is required.

It is suggested that the purser, when selected, should consult with this Committee in relation to further details.

Very respectfully,

William N. Bullard,
Henley Luce,
George H. Monks.

Appendix A. No.

HOSPITAL SHIP "BAY STATE."

Purser's Office.

189 .

Received from
Quantity. Articles.

I hereby certify that the above goods have been received.

HOSPITAL SHIP "BAY STATE."

REQUISITION.

The following articles are required for immediate use:

ARTICLES.

Requested by
Approved by
Received by
189 .

Appendix B.

Journal Ledger	$10.50
Inventory books	6.75
Subsidiary account books	9.00
Pay roll	2.25
Requisition papers	
Check books	
Vouchers	
Blank receipts	
Memorandum or miscellaneous books	25.00
Blotting paper, 5 quires, whole sheets	5.00
Inkstands, safety, 1 doz.	4.25
Penholders, 6 doz.	1.50
Pencils, 1 gross	3.00
Erasers, rubber, ½ lb.	1.25
Erasers, knife, ½ doz.	2.50
Black copying ink, 1 doz. quarts	7.50
Red ink, 2 quarts	4.00
Mucilage, 2 quarts	1.50
Pens, gross	.75
Pyramid pins, 1 doz.	1.00
Spindles, 1 doz.	2.50
Letter files, standard, 1 doz.	4.50
Letter clips, 1 doz.	1.00
Waste baskets, No. 9 close, ½ doz.	4.50
Letter baskets, ½ doz.	4.50
Envelopes, paper bill heads	10.00
Rubber bands	
Paper fasteners	
Copy book and press, with accessories	25.00
Safe	70.00
	$——

All, with the exception of safe, may be obtained of the M. R. Warren Co., Washington Street.

REPORT OF COMMITTEE ON TENTS.

BOSTON, June 20, 1898.

DR. HERBERT L. BURRELL,
Secretary of the Medical Committee,
Massachusetts Volunteer Aid Association:

Sir, — It seems to your Committee that the need for tents in connection with the ambulance ship proposed to be sent out by the Massachusetts Volunteer Aid Association is only that a temporary cover from sun and rain may be provided when the patients are being transferred to and from the ship. In the opinion of your Committee this would be accomplished by not less than four or more than six ordinary hospital tents, made according to the specifications of the United States Army, except that they should be made of drab canvas to reduce the glare which comes from the sun falling on the white canvas of the ordinary tent, and should have a second light ridge-pole, so that the fly can be raised a few inches from the roof of the tent in order to allow a circulation of air. Tents of this kind have been recently constructed by the State of Massachusetts and sent to the front with the Massachusetts troops. These tents were constructed by Wilson & Silsby, of Boston, and could be duplicated complete with flies for $75, which is considerably less than the original tents cost.

These tents should be provided with pins and mauls to put them up. The pins should be put into a canvas bag, and this, together with the tent, which has been rolled, put into a large bag constructed like a sailor's bag. When so encased they occupy the least possible amount of room, and everything necessary is provided at once for erecting the tent. The bags cost $4.00 a tent.

The deck of the ship should be shaded with some sort of awning, which, if of canvas, should be a double awning, the upper one of heavy white duck as a rain protection and the under one of lighter weight drab-colored duck, separated from the upper by a foot or two to allow a circulation of air between the awnings. Such awnings, if covering the entire ship, would cost in the neighborhood of $450.

Enclosed is a sample of drab canvas used in the construction of the new hospital tents mentioned, as ordered by the State of Massachusetts.

Very respectfully,

MYLES STANDISH,
For the Committee.

REPORT OF COMMITTEE ON UNIFORMS OF THE SHIP'S CREW.

Uniforms of the ship's crew to be in general like or nearly like those worn by the United States Naval Service, the distinction to be made by the use of the words *Bay State* and the red cross device as insignia.

In considering the uniforms of officers, the following officers are considered as holding positions analagous to similar positions in the Naval Service:

Officers. — Captain, 1st officer, 2d officer, chief engineer, 1st assistant, 2d assistant, medical director, 1st medical officer, 2d medical officer, representative of Government, National or State, purser. Eleven in all.
Petty Officers. — Steward, 2d steward, three oilers, two supervisors, cook and 2d cook. Nine in all.
Crew. — Seven sailors, six firemen. Thirteen in all.
Steward's Department. — Four steward's boys. Four in all.
Medical Department. — Six male nurses. Six in all.
Female Nurses. — Two head nurses, six nurses. Eight in all.

BILL OF DRESS FOR OFFICERS.

A.—COLD WEATHER. B.—HOT WEATHER.

Blouse, trousers and cap of dark blue, similar in material and cut to those worn by U. S. Navy; also overcoat.

(A)	Estimated cost of blouse	$15.00
	" " trousers	6.50
	" " cap	4.00
	" " overcoat	24.00
(B)	White duck blouse	$7.50 to 10.00
	" " trousers	2.50
	" " cap (2 covers)	2.50
	Four suits.	

Petty Officers:

(A)	Blue cloth reefer	$9.00
	" " trousers	4.50
	" " cap	1.50
	" " pea jacket	8.00 to 10.50
(B)	White duck reefer	4.00
	" " trousers	1.00
	" " cap (2 covers)	1.50
	Four suits.	

Crew:

(A)	Blue cloth shirt	$3.00
	" " trousers	4.00
	" " cap	.88
	" " pea jacket	8.00 to 10.50
	Black handkerchief	1.00
(B)	White working suit	1.75
	Four suits.	

Steward's Boys:

(A)	Blue cloth steward's jacket	$6.00
	" " trousers	4.00
	" " cap	1.50
	" " pea jacket	8.00 to 10.50
(B)	Short white duck jacket	1.00
	White duck trousers	.75
	" " cap or canvas hat	.40
	Four suits.	

Male Nurses:

(A)	Blue single-breasted sack " " trousers, vest	$15.00
	" cap (serge)	1.50
	" pea jacket	8.00 to 10.50
(B)	White duck single-breasted blouse	4.00
	" " trousers	1.00
	" " cap	1.50
	Four suits.	

Female Nurses:

(A)	Cloak or jacket or golf cloak or mackintosh	$5.00
(B)	Gown of cotton seersucker	3.00
	White cotton apron	.50
	White duck cap (yachting)	1.50

Department for Engineers:
Working suits of blue denim, blouse and trousers. $1.20

For Entire Ship's Company:
Oil skins $1.50

Female nurses, scallop skirt. For all the men for shore duty, cork helmets.

INSIGNIA.

Officers' Caps. — Name of office in gold letters. On collar the words "Bay State" in gold letters.
Petty Officers. — "Bay State" on front of cap. Rank on sleeve.
Crew. — "Bay State" on front of hats and caps.

Steward's Boys. — "Bay State" on cap.
Male Nurses. — "Bay State" on cap.
Female Nurses. — "Bay State" on cap.
Entire ship's company to have red cross on white brassard on each sleeve.

OFFICERS' BUTTONS.

On officers to be plain gold buttons, on petty officers silver buttons, on sailors and firemen black buttons, on male nurses black buttons.

SUMMARY OF COST.

(A)	Officers' uniforms	$49.50
(B)	Officers' uniforms, four suits and cap	42.50
		$92.00
	Eleven in all	$1,012.00
(A)	Petty officers	$23.00
(B)	Petty officers, four suits and cap	21.50
		$44.50
	Nine in all	$400.50
(A)	Crew	$16 88
(B)	Crew, four suits and cap	7.00
		$23.88
	Thirteen in all	$310.44
(A)	Steward's boys	$19.50
(B)	Steward's boys, four suits	8.60
		$28.10
	Four in all	$112.40
(A)	Male nurses	$24.50
(B)	Male nurses, 4 suits	21.50
		$46.00
	Six in all	$276.00
(A)	Female nurses, including 4 dresses, 10 aprons, white duck cap, mackintosh	25.50
	Eight in all	$204.00
	Total	$2,397.80
	20 white cork helmets for field service at $1.75	35.00
	1 doz. blue overalls for engineer's dept. at $1.00	12.00
	Grand total	$2,444.80

Oil skins for all the men at $1.75.

It is the unanimous opinion of this Committee that when the nature of the work to be done and the climatic conditions of the field of operations are considered, an outfit nearly like that recommended in this report will be found to be necessary.

For the Committee,

WM. W. CHURCHILL, *Secretary.*

P. S. — Whatever clerical errors that may be found in the above are due to the extreme haste in which this has been prepared.

Gold lettering in insignia at the rate of 6 cts. per letter.

REPORT OF THE COMMITTEE ON THE "ROUTINE OF LIFE UPON THE HOSPITAL SHIP."

BOSTON, June 18, 1898.

TO MASSACHUSETTS VOLUNTEER AID ASSOCIATION:

Gentlemen, — The Committee on the "Routine of Life upon the Hospital Ship" begs to present a preliminary report. The problem consists of the drill and utilization of individuals during the trip toward the seat of war and their service on the return.

The Committee recommend in general (leaving details until the actual work is more fully developed) that the service be conducted on the principle of the routine of the Naval Service, and in drill when empty, accompanied by hours of instruction. When the ship is loaded with patients the routine, of course, should be strictly carried out under careful inspection, as would be the custom on a man-of-war.

The details for the comfort and amusement of the patients have not yet been completed, but the selection of a small library is suggested for such of the patients as may be able to be about, and of games, halma, cards, etc. Arrangements should be made for the ready removal of the patients upon deck, and for lounging chairs, wood and canvas, for all who are able to get about themselves.

Yours very truly,

E. H. BRADFORD,
For the Committee.

REPORT OF COMMITTEE ON VENTILATION.

BOSTON, MASS., June 22, 1898.

PROF. S. H. WOODBRIDGE, Boston, Mass.:

Dear Sir, — I am authorized by the Committee on Ventilation of the steamship *Marmion*, hospital ship for Massachusetts Volunteer Aid Association, to engage your services in consultation concerning the ventilation of this vessel. The problem is as follows:

The General Committee wish to be able to care for a minimum number of 100 patients and a maximum number of 130 patients. The cubical contents of the wards on the lower deck is 24,000 cubic feet. There are 12,000 cubic feet in the lower tier which may be used as an emergency ward for the 30 additional patients. The stud of the wards is 7 feet 11 inches to underside of deck.

It is recognized by those in authority that the air capacity does not approach the minimum of hospital requirements, but it is supposed that there is little or no chance that it will be necessary to batten the hatches. It is requisite that there should be as frequent change of air as is practicable, and that there should be no possibility of a lack of artificial air supply. The Committee, therefore, wish two fans of as large capacity as the space will admit, and, if possible, arranged so that they may be used separately for the whole work or run together dividing the work. There is to be a refrigerating plant on the vessel, and the cooling of the air is desired by the Committee if you consider it advisable to attempt to do this.

The most difficult part of the problem would appear to be the deflection of the air to prevent draughts. The Committee would call to your attention the possible advisability of admitting part of the air under the lower tier of beds; the underside of beds might be shielded from chill by screens of plaster on light iron frame. There is to be an electric service, and small fans, such as are used in offices, may be used where you may wish to keep the air in motion.

If you need any space occupied by bunks for air ducts you are at liberty to use same, but it is desired that the number of beds as above enumerated should be retained.

You will please visit the vessel as soon as possible, as speed is requisite and everything now depends upon the installation of the ventilating apparatus. The Committee hope to have the boat ready to sail on July 10th. In visiting the vessel make appointment by telephone with Mr. Boyd, the engineer of the Atlantic Works, East Boston, who will show you the vessel and explain the plans. Mr. Boyd prefers to have us employ the Sturtevant Blower Company, and he has already had Mr. Sawyer of that company inspect the vessel. You may use your own judgment as to whether or not Mr. Sawyer should be present at your first meeting with Mr. Boyd, but do not postpone your first visit to the vessel if you find that an early appointment cannot be arranged with Mr. Sawyer. Dispatch in this matter is the first consideration.

Please make a preliminary report to me immediately after your first inspection of the vessel. I trust that you may be able to go to East Boston this morning.

Yours truly,

EDMUND M. WHEELWRIGHT.

ABSTRACT FROM SOCIETY'S TRANSACTIONS.

THE foregoing papers were read at meetings of the Boston Society for Medical Improvement, and at the regular meeting on Monday, November 21, 1898, the President, DR. R. H. FITZ, said: "The object of the meeting to-night, and also of the next meeting of the Improvement Society, is to listen to the gentlemen who were concerned with the medical work of the Massachusetts Volunteer Aid Association. Early in the summer, as Dr. Burrell was about to depart on the *Bay State*, I told him the Society would be much interested to hear from him and his associates of the work accomplished, and he was good enough to bear this request in mind. Through *his* aid and that of Dr. Bradford, the details of these meetings have been

arranged. At this meeting it has been considered best to limit the communications to the period of the departure of the *Bay State* from Boston. At the next meeting the gentlemen distributing aid at Santiago, Porto Rico and elsewhere will give their experience. I will ask Dr. Burrell to open the meeting with a statement of the manner in which the Volunteer Aid Association began its work."

Dr. G. H. Monks showed upon the screen some stereopticon pictures from instantaneous photographs taken of the *Bay State* on August 6th, as she was leaving the wharf of the Atlantic Works, East Boston, and proceeding down the harbor, bound on her first trip (as a hospital ship) to the West Indies.

At the next regular meeting, December 5, 1898, after the papers of the medical agents were read, the President, Dr. Fitz, asked Dr. Burrell to close the meeting by telling the Society of what became of the hospital ship.

Dr. Burrell spoke as follows: "As the hospital ship *Bay State* continued to do its work through its successive voyages it was finally determined to offer to the Government the vessel for a minimum price. A committee composed of various officers of the Association waited upon Mr. Alger and General Sternberg, who, when told of the offer to transfer the ship, fully equipped, for $100,000, were very much pleased. This sum of money had to be paid out of the war fund controlled by the President, and a committee of experts, composed of Messrs. Kirby and Clarke, came to Boston to inspect the vessel. She was carefully examined by these gentlemen, who told me that they were extremely interested in the details of her construction and equipment. The arrangement of berths for patients challenged the admiration of Mr. Clarke, who was at the time in the process of constructing and equipping a large number of vessels for transport service for the United States Army.

"The ship was very interesting and instructive to them, and it has seemed to me that the Government was peculiarly fortunate in securing a vessel which cost approximately $175,000 for $100,000.

"As a hospital ship she was complete in every detail. She did her work without any break-down in her equipment or her medical department. It is believed that she carried more patients for a given length of time, per tonnage, than any other hospital ship."

THE LIBRARY.

Early in June Mr. Herbert Putnam, the Librarian of the Boston Public Library, was requested to make up a list of books which would be suitable for the hospital ship. A great deal of care was exercised in selecting this list, and it is interesting in that it is made up largely from modern literature. It was a constant source of pleasure to those of the patients who were able to read, and was a bit of civilization that they highly appreciated. Appended is a list of the books in the library of the Massachusetts hospital ship *Bay State:*

History.

Barnes, James. Naval Actions of the War of 1812.
— Yankee Ships and Yankee Sailors: — Tales of 1812.
Fiske, John. The American Revolution. Illustrated.
— Civil Government in the United States Considered with some Reference to its Origins.
Forbes, Archibald. Czar and Sultan. The Adventures of a British Lad in the Russo-Turkish War of 1877–78.
Hale, Edward Everett, and Susan Hale. Spain. [Story of the Nations.]
Headley, Joel Tyler. The Imperial Guard of Napoleon. From Marengo to Waterloo.
Higginson, Thomas Wentworth. A Larger History of the United States of America to the Close of President Jackson's Administration.
Hough, E. The Story of the Cowboy. [Story of the West Series.]
Latimer, Elizabeth Wormeley. Spain in the Nineteenth Century.
Maclay, Edgar Stanton. History of the United States Navy from 1775–1898. 2 vols.
Oman, Charles. A History of the Art of War. Vol. 1.
Rowan, Andrew Summers, and Marathon Montrose Ramsey. The Island of Cuba.
Ryan, Charles Edward. With an Ambulance during the Franco-German War.
Slatin, Rudolf C., Pasha. Fire and Sword in the Soudan, 1879–1895.
Trevelyan, George Otto. Cawnpore.
Williams, Hamilton. Britain's Naval Power. A Short History of the Growth of the British Navy. 2 vols.
Wilson, Henry Walter. Ironclads in Action. Introduction by A. T. Mahan. 2 vols.

Biography.

Blake, Robert.
  Hannay, D. Admiral Blake. [English Worthies.]
Bruce, Robert.
  Maxwell, Sir H. E. Robert the Bruce and the Struggle for Scottish Independence. [Heroes of the Nations.]
Clive, Lord.
  Wilson, Sir Charles, Colonel. Lord Clive. [English Men of Action.]
Cook, James.
  Besant, Walter. Captain Cook. [English Men of Action.]
Cromwell, Oliver.
  Harrison, Frederic. [Twelve English Statesmen.]
Dampier, William.
  Russell, W. Clark. William Dampier. [English Men of Action.]
Drake, Sir Francis.
  Corbett, J. S. Drake and the Tudor Navy. 2 vols.
Farragut, David Glasgow.
  Mahan, A. T. Admiral Farragut. [Great Commanders.]
Gordon, Charles George.
  Butler, Sir W. F. Charles George Gordon. [English Men of Action.]
Grant, Ulysses Simpson. Personal Memoirs. 2 vols.
Hannibal.
  Morris, W. O'C. Hannibal, Soldier, Statesman, Patriot. [Heroes of the Nations.]
Havelock, Sir Henry.
  Forbes, Archibald. Havelock. [English Men of Action.]
Henry the Navigator.
  Beazley, C. R. Prince Henry the Navigator. [Heroes of the Nations.]
Jackson, Stonewall.
  Cooke, J. Esten. Stonewall Jackson.
Johnston, Joseph Eggleston.
  Hughes, R. M. General Johnston. [Great Commanders.]
Lee, Robert Edward.
  Jones, J. W. Personal Reminiscences, Anecdotes and Letters of General Lee.
  Lee, Fitzhugh. General Lee. [Great Commanders.]
  White, H. A. Robert E. Lee and the Southern Confederacy. [Heroes of the Nations.]
Lincoln, Abraham.
  Morse, J. T., Jr. Abraham Lincoln. 2 vols. [American Statesmen.]
Marlborough, Duke of.
  Saintsbury, George. Marlborough. [English Worthies.]
Miles, Nelson Appleton. Personal Recollections and Observations.
Napier, Sir Charles.
  Butler, Sir W. F. Sir Charles Napier. [English Men of Action.]
Nelson, Horatio.
  Russell, W. Clark. Horatio Nelson and the Naval Supremacy of England. [Heroes of the Nations.]
Raleigh, Sir Walter.
  Gosse, Edmund. Raleigh. [English Worthies.]
Sherman, William Tecumseh. Memoirs. 2 vols.
Sidney, Sir Philip.
  Bourne, H. R. Fox. Sir Philip Sidney. [Heroes of the Nations.]
Stuart, James Elwell Brown.
  McClellan, H. B. The Life and Campaigns of Major-General J. E. B. Stuart.
Twelve Naval Captains. By Molly Elliot Seawell.
Wellington, Duke of.
  Hooper, G. Wellington. [English Men of Action.]
William the Conqueror.
  Freeman, E. A. William the Conqueror.
Wolfe, General James.
  Bradley, A. G. Wolfe. [English Men of Action.]

Travel and Adventure.

Ballou, Maturin Murray. Due South; or, Cuba Past and Present.
— Equatorial America: Descriptive of a Visit to St. Thomas, Martinique, Barbadoes, and the Principal Capitals of South America.
Bigelow, Poultney. White Man's Africa.
Burnaby, Frederick G. A Ride to Khiva: Travels and Adventures in Central Asia.
Cabrera, Raimundo. Cuba and the Cubans.
Chanler, William Astor. Through Jungle and Desert. Travels in Eastern Africa.
Choyce, J. The Log of a Jack Tar. [Adventure Series.]
Clifford, Edward. Father Damien: A Journey from Cashmere to his Home in Hawaii.
Custer, Elizabeth B. Boots and Saddles.
— Tenting on the Plains.
Davis, Richard Harding. Cuba in War Time.
— The Rulers of the Mediterranean.
— Three Gringos in Venezuela and Central America.
— The West from a Car-Window.
Drummond, Henry. Tropical Africa.
Flint, Grover. Marching with Gomez.
Ingersoll, Ernest. Golden Alaska.
Jenkyns, Catherine Carlyon, Compiler. Hard Life in the Colonies, and Other Experiences by Land and Sea. [Adventure Series.]
King, Charles. Campaigning with Crook, and Stories of Army Life.
Knight, Edward Frederic. Where Three Empires Meet: A Narrative of Travel in Kashmir, Western Tibet, Gilgit, and the Adjoining Countries.
Latude, Jean Henri Masers de. The Escapes of Casanova and Latude from Prison. [Adventure Series.]
Logan, John Alexander, Jr. In Joyful Russia.
Lumholtz, Carl Sophus. Among Cannibals: An Account of Four Years' Travels in Australia and of Camp Life with the Aborigines of Queensland. [Library of Contemporary Adventure.]
Lummis, Charles Fletcher. The Land of Poco Tiempo. [New Mexico.]
Martin, Annie. Home Life on an Ostrich Farm.
Meriwether, Lee. A Tramp Trip: How to See Europe on Fifty Cents a Day.
— The Tramp at Home.
Nansen, Fridtjof. Farthest North.
Peary, Robert Edward. Northward Over the "Great Ice."

Pinto, Fernão Mendes. Voyages and Adventnres of Ferdinand Mendez Pinto. [Adventure Series.]
Pyle, Howard. Buccaneers and Marooners of America. [Adventure Series.]
Remington, Frederic. Pony Tracks. [Western Travel.]
Roche, James J. The Story of the Filibusters.
Roosevelt, Theodore. Ranch Life and the Hunting-Trail.
Shipp, John. Memoirs of the Extraordinary Military Career of John Shipp. [Adventure Series.]
Smith, Francis Hopkinson. A White Umbrella in Mexico.
Smith, George Barnett. Sir John Franklin and His Romance of the Northwest Passage.
Stables, W. Gordon. To Greenland and the Pole.
— Westward with Colnmbus.
Stanford's Compendinm of Geography and Travel. Central America, the West Indies and South America.
Stanley, Henry Morton. My Early Travels and Adventures in America and Asia. 2 vols.
Stevenson, Robert Lonis. Travels with a Donkey in the Cévennes.
Tiffany, Francis. This Goodly Frame the Earth.
Twain, Mark. (S. L. Clemens.) Following the Eqnator: A Journey Around the World.
Zogbaum, Rufns Fairchild. "All Hands." Pictnres of Life in the United States Navy.
— Horse, Foot and Dragoons: Sketches of Army Life at Home and Abroad.

Miscellaneous.

Antoninus, Marcus Aurelius. Thoughts.
Bible.
Book of Common Prayer.
Brooks, Phillips. The Light of the World, and Other Sermons.
Bunyan, John. Pilgrim's Progress.
Carleton, Will. Farm Ballads.
Field, Eugene. A Little Book of Western Verse.
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— The Woman in White.
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— The Three Musketeers. 2 vols.
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— The Vicomte de Bragelonne. 6 vols.
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— That Affair Next Door.
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